

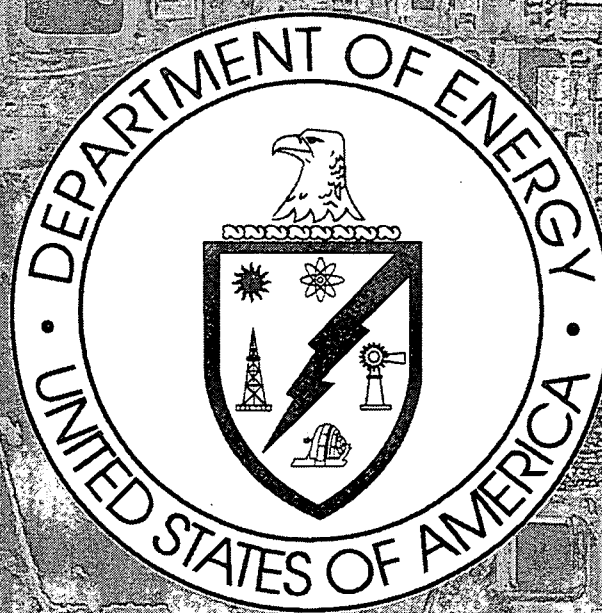
CONSTRUCTION QUALITY ASSURANCE

FINAL REPORT

ON-SITE DISPOSAL FACILITY

PHASE II CELL 2

REVISION 0
DECEMBER 1998
VOLUME VII



United States Department of Energy
Fernald Environmental Management Project
Fernald, Ohio

prepared by

GEO-SYNTEC CONSULTANTS

1100 Lake Hearn Drive, NE, Suite 200
Atlanta, Georgia 30342

under

Fluor Daniel Fernald
Subcontract 95PS005028

APPENDIX S:
REQUEST FOR CLARIFICATION
OF INFORMATION (RCI)
OSDF Phase II Cell 2 (20102)

2064

OSDF Phase II Cell 2 (20102)

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Request for Clarification of Information
Fernald On-Site Disposal Facility, Phase Two Activities

Approved or Voided	RCI No.	RCI Title	Date	Requestor	Design Organization Approval/Disapproval	FCE/PE	Construction Concurrence
A	20102-001R (DCN# 20102-003)	CRB Questions about GML, GCL and Geotextile Specifications	18-Feb-98	Rick Heath	Ken Cargill	Rick Heath	N/A
A	20102-002R (DCN# 20102-011)	Significant Digit for Geotextile Filter AOS	6-May-98	Dan Bodine	Dan Bodine	Rick Heath Don Goetz	Don Goetz 5/6/98
A	20102-003R (DCN# 20102-031)	Phase II Former North Entrance Road Removal	14-May-98	Maureen Richard	Dan Bodine Uday Kumthekar	Jim Jenkins Don Goetz	Kevin Harbin 8/6/98
A *	20102-004R	Borrow Area Sedimentation Basin Layout	14-May-98	Maureen Richard	Uday Kumthekar	Jim Jenkins Don Goetz	Lou Wehlitz 5/19/98
VOID	20102-005R (DCN# 20102-012)	Deletion of Intergraph Microstation Requirement	19-May-98	Rick Schairbaum	Dan Bodine	Jim Jenkins Don Goetz	Don Goetz 5/27/98
A	20402-006R (DCN#20402-018)	Deletion of Intergraph Microstation Requirement	19-May-98	Rick Schairbaum	Carlton Schroeder	Frank Flack	Frank Flack 6/11/98
A	20102-007R	Clarification to Drawings and Specifications	10-Jun-98	Dan Bodine	Dan Bodine	Jim Jenkins Don Goetz	Don Goetz 6/15/98
A	20102-008R	Cell Access Ramp Construction	23-Jun-98	Kevin Iler	Dan Bodine Kwasi Badu-Tweneboah	Jim Jenkins Don Goetz	Don Goetz 7/15/98
A	20102-009R (DCN # 20102-038)	Control Point Discrepancies	23-Jun-98	Steve Brandstetter	Dan Bodine	Jim Jenkins	Don Goetz 7/13/98
A	20102-010R (DCN#20102-039)	East Drainage Channel, Cell 3	8-Jul-98	Steve Brandstetter	Dan Bodine Kwasi Badu-Tweneboah	Jim Jenkins Don Goetz	Don Goetz 7/13/98
A *	20102-011R	Clarification on the Use of Water Spray Bar for Moisture Conditioning	13-Jul-98	Kwasi Badu-Tweneboah	Dan Bodine	Jim Jenkins Don Goetz	Don Goetz 7/13/98
A	20102-012R	Clarification of "Soil Like" Material Definition	13-Jul-98	Steve Brandstetter	Dan Bodine	Jim Jenkins Don Goetz	Don Goetz 7/20/98
A	20402-013R (DCN#20402-041)	Construct Interceptor Ditch Concurrently with IFP Excavation	13-Jul-98	Steve Brandstetter	Dan Bodine	Jim Jenkins Don Goetz	Don Goetz 9/15/98
On Hold per Melissa in Doc Ctrf.	014R	Improvements to Dozer Push Operations at SP-5	16-Jul-98	Bruce Schweitzer			
A	20402-015R	Clarification of Interceptor Ditch @ SP-5	20-Jul-98	Frank Flack	Tim Hiles	Christopher Neumann	Frank Flack 7/27/98

* Indicates only RCI's that were Not Changed to DCN's and are applicable to Cell 2 Construction

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Request for Clarification of Information
Fernald On-Site Disposal Facility, Phase Two Activities

Approved or Voided	RCI No.	RCI Title	Date	Requestor	Design Organization Approval/Disapproval	FCE/PE	Construction Concurrence
A	20102-016R	Proposed Change in Compactive Equipment	21-Jul-98	Rick Schairbaum	Dan Bodine	Jim Jenkins Don Goetz	Don Goetz 7/24/98
A	20102-017R	Sediment and Erosion Control at the Impacted Runoff Catchment Area - Cell 1	22-Jul-98	Rick Schairbaum	Dan Bodine	Rick Heath Don Goetz	Don Goetz
A	20102-018R	Clarification on the Compaction Quality Control Testing Frequency	30-Jul-98	Kwasi Badu-Tweneboah	Dan Bodine	Jim Jenkins	Kevin Harbin 8/6/98
VOID	20102-019R	Clarification on Category 3 Placement Procedures	30-Jul-98	Rick Schairbaum	Dan Bodine	Jim Jenkins	Bruce Schweitzer
VOID	20102-020R	Clarification of Impacted Material Categories	3-Aug-98	Rick Schairbaum	Dan Dodine	Jim Jenkins	Bruce Schweitzer
A	20402-021R	Silt Fence Maintenance	3-Aug-98	Rick Schairbaum	Carlton Schroeder	Jennifer Blankemeyer	Lee McDaniel 8/3/98
A *	20102-022R	Revision to the Rock Correction Criteria for Compacted Clay Liner Material	5-Aug-98	Kwasi Badu-Tweneboah	Dan Bodine	Jim Jenkins Don Goetz	Don Goetz 8/11/98
On hold per Doc Cfr.	20102-023R	Cell 1 Access Ramp and Access Road Improvements	10-Aug-98	Rick Schairbaum	Dan Bodine	Jim Jenkins	
A	20102-024 (DCN# 20102-052)	Fertilizer and Seeding Clarification	11-Aug-98	Rick Schairbaum	Dan Bodine	Jim Jenkins	Don Goetz 8/26/98
A	20402-025R (DCN#20402-051)	Fertilizer and Seeding Clarification	11-Aug-98	Rick Schairbaum	Kenneth Gerard	Jennifer Blankemeyer	Frank Flack 8/24/98
A	20102-026R	Clarification on Category 3 Placement Procedures	14-Aug-98	Rick Schairbaum	Dan Bodine	Jim Jenkins	Bruce Schweitzer 8/21/98
A	20102-027R	Clarification of Impacted Material Categories	14-Aug-98	Rick Schairbaum	Dan Bodine	Jim Jenkins	Bruce Schweitzer 8/21/98
A	20102-028R (DCN# 20102-058)	Preparation of Trial Seams for HDPE Liner	14-Sep-98	Rick Schairbaum	Dan Bodine	Jim Jenkins Don Goetz	Don Goetz 9/15/98
A	20102-029R	Improvements to Dozer Push Operations at SP-5	16-Jul-98	Bruce Schweitzer	Dan Bodine	Jim Jenkins	Don Goetz 9/24/98
A *	20102-030R	Placement of Bentonite Granules Between GCL Panels	14-Sep-98	Rick Schairbaum	Dan Bodine	Kim Jenkins	Don Goetz 9/18/98
A	20102-031R	Construction of Impacted Runoff Catchment Area	14-Sep-98	Rick Schairbaum	Dan Bodine	Jim Jenkins	Don Goetz 9/24/98

Request for Clarification of Information
Fernald On-Site Disposal Facility, Phase Two Activities

Approved or Voided	RCI No.	RCI Title	Date	Requestor	Design Organization Approval/Disapproval	FCE/PE	Construction Concurrence
A *	20102-032R	Construction of Cell 2 Clay Wedge	14-Sep-98	Rick Schairbaum	Dan Bodine	Jim Jenkins	Don Goetz 9/24/98
A	20402-033R	Interceptor Ditch Detail at the GMA	9-Oct-98	Rick Schairbaum	Carlton Schroeder	Rick Heath Don Goetz	Lee McDaniel 10/9/98
A	20102-034R	Category 5 Material Trenches	17-Oct-98	Rick Schairbaum	Dan Bodine	Jim Jenkins	Kevin Harbin 8/6/98
A	20102-035R	Perimeter & Southern Ditch Detail at Cell 1	17-Oct-98	Rick Schairbaum	Dan Bodine	Jim Jenkins	Don Goetz 10/29/98
A *	20102-036R	Clarification of Protective Layer Material	17-Oct-98	Rick Schairbaum	Dan Bodine	Jim Jenkins	Don Goetz 10/29/98

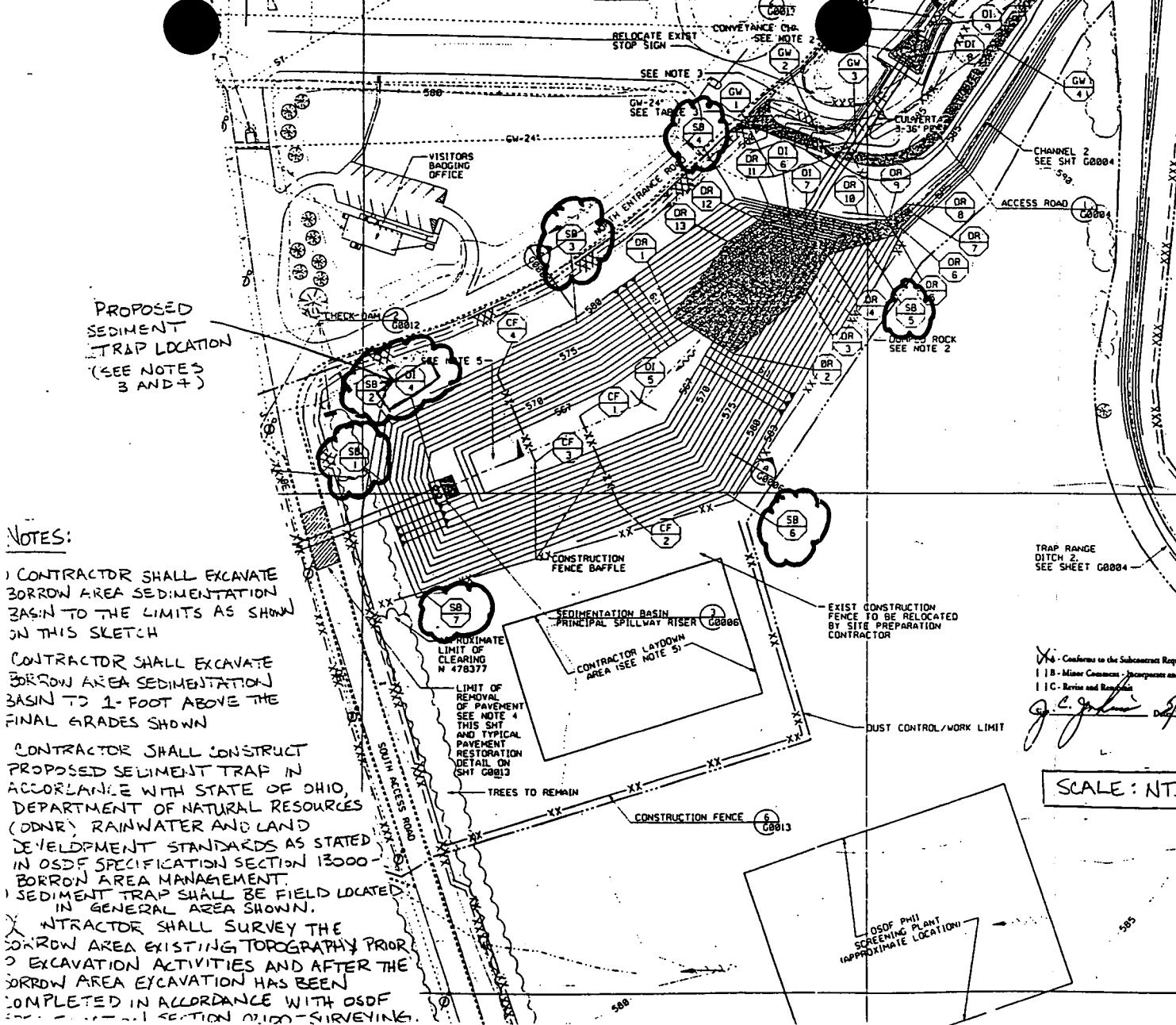
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RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102		(2) S/C NO.: FSC-614		(5) Pg 1 OF 2	(6) DATE 05/14/98
(3) S/C TITLE: OSDF PHASE II					(11) RCI NO.: 20102-004R
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input type="checkbox"/> OTHER <input checked="" type="checkbox"/>		(4A) RCI/DCN TITLE: BORROW AREA SEDIMENTATION BASIN LAYOUT			(11) DCN NO.:
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS		(7) REV:	(8) OTHER
OSDF Specification Section 02100 Surveying					
OSDF Specification Section 13000 Borrow Area Management					
(9) <input checked="" type="checkbox"/> RCI - INQUIRY <input type="checkbox"/> USQD SCREENING BY PROJECT ENGINEER			(9) <input type="checkbox"/> DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE		
<p>The Phase II OSDF contract states the OSDF contractor is to excavate the Borrow Area Sedimentation Basin prior to commencement of Borrow Area activities. The attached sketch 20102-SK-002 shows in plan view the limits of excavation for the sedimentation basin.</p> <p>The OSDF Contractor shall excavate clay liner soil material from the borrow area to elevations approximately 1-foot above the sedimentation basin final grades shown on the sketch.</p> <p>The OSDF Contractor shall survey the borrow area existing conditions prior to excavation activities and after the borrow area excavation has been completed in accordance with OSDF Specification Section 02100 - Surveying.</p>			<p>A proposed sediment trap shall be field located in the general area shown on the sketch. The Contractor shall construct the sediment trap in accordance with State of Ohio, Department of Natural Resources (ODNR), Rainwater and Land Development Standards as stated in OSDF Specification Section 13000 - Borrow Area Management.</p>		
INFORM ON					
(10) REQUESTOR: MAUREEN RICHARD		COMPANY: FDF		DATE: 05/14/98	(12) CE / PE DONALD B. GOETZ JAMES C. JENKINS
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input checked="" type="checkbox"/> NO <input type="checkbox"/> YES		(14) FOR DCN: <input type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED			
RCI - DCN ACCEPTANCE					
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: UDAY KUMTHEKAR			(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N.A.		
DATE: 5/15/98			DATE: 5/15/98		
<input type="checkbox"/> FIT <input type="checkbox"/> FORM <input type="checkbox"/> FUNCTION					
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)					
- N.A.					
PERFORMANCE GRADE: (17)					
(18) CONSTRUCTION CONCURRENCE: L. B. Behtley			(21) WORK COMPLETED: (SIGNOFF BY CE OR PE)		
DATE: 5/19/98			DATE:		
PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO (19)					



NOTES:

- 1 CONTRACTOR SHALL EXCAVATE BORROW AREA SEDIMENTATION BASIN TO THE LIMITS AS SHOWN ON THIS SKETCH
- 2 CONTRACTOR SHALL EXCAVATE BORROW AREA SEDIMENTATION BASIN TO 1-FOOT ABOVE THE FINAL GRADES SHOWN
- 3 CONTRACTOR SHALL CONSTRUCT PROPOSED SEDIMENT TRAP IN ACCORDANCE WITH STATE OF OHIO, DEPARTMENT OF NATURAL RESOURCES (ODNR) RAINWATER AND LAND DEVELOPMENT STANDARDS AS STATED IN OSDF SPECIFICATION SECTION 13000 - BORROW AREA MANAGEMENT.
- 4 SEDIMENT TRAP SHALL BE FIELD LOCATED IN GENERAL AREA SHOWN.
- 5 CONTRACTOR SHALL SURVEY THE BORROW AREA EXISTING TOPOGRAPHY PRIOR TO EXCAVATION ACTIVITIES AND AFTER THE BORROW AREA EXCAVATION HAS BEEN COMPLETED IN ACCORDANCE WITH OSDF SPECIFICATION SECTION 13000 - SURVEYING.

TABLE 1
CENTERLINE DITCH/CHANNEL COORDINATES (DI)

POINT	NORTHING	EASTING	DESCRIPTION
1	478285.65	1349589.35	INTERSECT DITCHES
2	478348.82	1349687.76	PI 48" RADIUS
3	478427.67	1349886.62	1/4 OF CHANNEL AT END OF 48" PIPES
4	478502.12	1350074.48	1/4 OF BASIN AT 48" RISERS
5	478589.30	1350273.91	ANGLE POINT IN BASIN
6	478753.81	1350425.13	1/4 OF BASIN AT BOTTOM OF SLOPE
7	478774.59	1350437.81	1/4 AT END OF CENTER 36" PIPE
8	478936.48	1350541.13	INLET OF CENTER 36" PIPE
9	478967.28	1350560.79	END 8' WIDE DITCH

(SEE SHT G0807 FOR ELEVATIONS ALONG DITCH/CHANNEL PROFILE)

TABLE 2
APIII SEDIMENT BASIN COORDINATES (SB)

POINT	NORTHING	EASTING	ELEVATION
1	478512.56	1350020.79	577.0
2	478569.76	1350029.22	577.0
3	478670.19	1350212.10	579.0
4	478794.40	1350368.52	581.0
5	478759.94	1350492.66	579.0
6	478498.57	1350361.23	582.0
7	478403.90	1350057.48	578.0

TABLE 3
EXIST GW-24" COORDINATES (GW)

POINT	NORTHING	EASTING	ELEVATION
1	478816.85	1350406.96	578.90
2	478837.50	1350461.70	578.67
3	478848.98	1350480.77	579.37
4	478947.86	1350623.93	582.48

TABLE 4
DUMPED ROCK COORDINATES (DR)

POINT	NORTHING	EASTING	ELEVATION
1	478677.39	1350336.05	571.0
2	478638.45	1350367.11	571.0
3	478701.99	1350439.43	576.0
4	478738.74	1350461.10	576.0
5	478759.02	1350520.01	584.0
6	478766.04	1350532.07	584.0
7	478779.47	1350546.09	584.0
8	478789.87	1350536.00	584.0
9	478776.68	1350521.72	584.0
10	478768.62	1350495.14	582.0
11	478790.08	1350400.99	582.0
12	478773.80	1350391.40	576.0
13	478752.28	1350360.68	576.0

TABLE 5
CONSTRUCTION FENCE BAFFLE COORDINATES (CF)

POINT	NORTHING	EASTING	ELEVATION
1	478577.74	1350215.34	567.0
2	478488.46	1350254.36	577.0
3	478532.29	1350171.58	567.0
4	478619.45	1350133.58	577.0

X - Conforms to the Subcontract Requirements
 I B - Minor Corrections - Incorporated and Rechecked
 I C - Review and Rechecked
G. C. Johnson 11/18/88

SCALE: NTS

SKETCH 20102-SK-002
BORROW AREA SEDIMENTATION
BASIN LAYOUT FOR RCI 20102-004R

000008

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RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102		(2) S/C NO.: FSC-614		(5) Pg 1 OF 31		(6) DATE 13 July 98	
(3) S/C TITLE: OSDF Phase II						(11) RCI NO.: 20102-011R	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN TITLE: Clarification on the Use of Water Spray Bar for Moisture Conditioning				(11) DCN NO.:	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.		(7) REV	(7) REV.	(8) OTHER	
20102-TS-001 Section 02225		Parts 2.02.F and 3.04.M		1			
(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER Part 2.02.F (page 02225-4) requires the use of a soil stabilizer with water spray bar for processing clay liner material. Part 3.04.M states that loose lift of clay liner material be moisture conditioned prior to compaction, if necessary. A soil stabilizer shall be used to distribute the moisture through the loose lift. It does not say that a water spray bar must be used to moisture condition the loose lift.							
(10) REQUESTOR: <i>W. Badu-Tweneboah</i>		COMPANY: GeoSyntec		DATE: 13 July 1998		(12) CE / PE <i>Don Goetz</i> <i>JAMES C. JENKINS</i> J.C. Jenkins 7/13/98 DATE: 07/13/98	
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input checked="" type="checkbox"/> NO <input type="checkbox"/> YES (14) FOR DCN: <input type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED The intent of the specification is to ensure that the loose lift is moisture conditioned uniformly and with the proper moisture content prior to compaction. Any equipment approved by the Construction Manager may be used to apply moisture to the soil. However, the specification does require the use of the soil stabilizer to help obtain uniform mixing and uniform soil consistency. Moisture is also being added to the soil during the soil screening and stockpiling activity.							
INFORMATION ONLY							
RCI - DCN ACCEPTANCE							
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: <i>Daniel Bodine</i> 13 July 98 Daniel Bodine <input type="checkbox"/> FIT <input type="checkbox"/> FORM <input type="checkbox"/> FUNCTION				(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N.A.			
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:							
(17) PERFORMANCE GRADE: N.A.							
(18) CONSTRUCTION CONCURRENCE: DATE: 07/14/98				(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:			
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO							



2064

Date: 7/13/98

Project/Contract/P.O. Name OSDF Phase II Project/Contract/P.O. No. FSC 614

Document Title _____

To Reviewers:

1. Review the attached Document/Submittal/DCN/RCI and return to: broken DUE DATE 7/13/98
2. Date and initial the appropriate "box" on this card.
3. Complete review by the date assigned to you and HAND CARRY the attached document and this card to the next person on the routing sequence. Last person on the routing sequence to HAND CARRY the attachment and this card and return to the person noted above.

Submittal/DCN/RCI No. 20102-112 Date: 7/13/98 Submittal/DCN/RCI Title CLARIFICATION ON USE OF WATER SPRAY BAL FOR MOISTURE CONDITIONING

Routing Sequence	Reviewing Discipline	Review To B Completed By	Review Completed By	Document/DCN/RCI		Summittal Status				Remarks
				Approved	Disapproved	"A"	"B"	"C"	"10"	
①	Engineering			<u>KRM</u>						OK but it does not address the direction
Reviewer:	HEATH/BARRER									
	Construction	<u>07/13/98</u>	<u>DB, 07/13/98</u>							required after must be added in the field
Reviewer:	GOETZ									
	Safety									
Reviewer:										
	Quality									
Reviewer:										
	Procurement									
Reviewer:										
	Project Controls									
Reviewer:										
	Envir. Compliance									
Reviewer:										
	Proj. Manager	<u>7/13/98</u>	<u>7/13/98</u>	<u>BOE</u>						
Reviewer:	KUMTHAKAR									
	Estimating									
Reviewer:										
	Title III A-E									
Reviewer:										
Reviewer:										
Reviewer:										

Special Instruction/Additional Comments:

Document Originator/DCN/RCI Requester: GEOSYNTEC

Sent to ECDC: Date: 7/13/98

Submittal/DCN/RCI Sent to Contractor: Date: _____

Status Definition

- A Reviewed
- B Reviewed, proceed with work incorporating comments. Change submittal as noted and resubmit
- C Change submittal as noted and resubmit
- 10 Information only

a:Udaycard

000010

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1)WP / WO NO.: 20102		(2)S/C NO.: FSC-614		(5)Pg 1 OF 1	(6)DATE 5 Aug 98
(3)S/C TITLE: OSDF Phase II					(11)RCI NO.: 20102-022R
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A)RCI/DCN TITLE: Revision to the Rock Correction Criteria for Compacted Clay Liner Material		(11)DCN NO.:	
(7)DOCUMENTS AFFECTED		(7)DOCUMENT NOS.	(7)REV	(7)REV.	(8)OTHER
GeoSyntec's Internal On-Site Testing Procedure					
<p>(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER</p> <p>If the correction is applied to stockpile samples with 5 or more percent rock content, and not to the others, GeoSyntec is currently applying rock (i.e. oversize there appears to be increased variability in the particles) correction to the results of standard Proctor maximum dry density (MDD) and optimum moisture compaction test (ASTM D 698), in accordance with content (OMC), thereby resulting in relatively large ASTM D 4718 for the compacted clay liner material. standard deviation.</p> <p>The rock correction is applied only when the rock content is equal to or greater than 5 percent. This is In order to provide uniformity and consistency to the based on recommendations from ASTM D 4718 that representative OMC and MDD used for the acceptable 5 percent may be used if a minimum percentage is permeability zone (APZ), as well as GeoSyntec's not specified by the person or agency specifying this improved internal quality control program, as of 3 August 1998, GeoSyntec will apply rock correction to all standard Proctor compaction tests on compacted</p> <p>Data obtained to-date from testing for Phase I and II clay liner material. construction indicate that the rock content of screened materials range from approximately 3 to 8 percent.</p>					
(10)REQUESTOR: <i>Kwasi Badu-Tweneboah</i> COMPANY: GeoSyntec		DATE: 5 August 1998		(12)CE / PE <i>Don Goetz</i> DATE: <i>08/11/98</i>	
(13)RESPONSE: FOR RCI, IS A DCN REQ'D? <input checked="" type="checkbox"/> NO <input type="checkbox"/> YES		(14) FOR DCN: <input type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED			
<p>Apply rock correction to all test samples, as noted above. Update GeoSyntec's Internal On-Site Testing Procedure, as necessary.</p>					
RCI - DCN ACCEPTANCE					
(15)DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: <i>Daniel Bodine</i> DATE: 5 August 1998		(20)CHARGE NO. FOR CADD SERVICES TO INCORPORATE: <i>N.A.</i>			
<input type="checkbox"/> FIT <input type="checkbox"/> FORM <input type="checkbox"/> FUNCTION					
(16)FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: <i>N.A.</i>					
(17) PERFORMANCE GRADE: <i>N.A.</i>					
(18)CONSTRUCTION CONCURRENCE: <i>Don Goetz</i> DATE: <i>08/11/98</i>		(21)WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:			
(19)PURCHASE REQUESTION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					



Standard Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles¹

This standard is issued under the fixed designation D 4718; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.

1. Scope

1.1 This practice presents a procedure for calculating the unit weights and water contents of soils containing oversize particles when the data are known for the soil fraction with the oversize particles removed.

1.2 The practice also can be used to calculate the unit weights and water contents of soil fractions when the data are known for the total soil sample containing oversize particles.

1.3 This practice is based on tests performed on soils and soil-rock mixtures in which the portion considered oversize is that fraction of the material retained on the No. 4 sieve. Based on these tests, this practice is applicable to soils and soil-rock mixtures in which up to 40 % of the material is retained on the No. 4 sieve. The practice also is considered valid when the oversize fraction is that portion retained on some other sieve, such as the $\frac{1}{4}$ -in. sieve, but the limiting percentage of oversize particles for which the correction is valid may be lower. However, the practice is considered valid for materials having up to 30 % oversize particles when the oversize fraction is that portion retained on the $\frac{1}{4}$ -in. sieve.

1.4 The factor controlling the maximum permissible percentage of oversize particles is whether interference between the oversize particles affects the unit weight of the finer fraction. For some gradations, this interference may begin to occur at lower percentages of oversize particles, so the limiting percentage must be lower for these materials to avoid inaccuracies in the computed correction. The person or agency using this practice shall determine whether a lower percentage is to be used.

1.5 This practice may be applied to soils with any percentage of oversize particles subject to the limitations given in 1.3 and 1.4. However, the correction may not be of practical significance for soils with only small percentages of oversize particles. The person or agency specifying this practice shall specify a minimum percentage of oversize particles below which the practice need not be applied. If a minimum percentage is not specified, 5 % shall be used.

1.6 This practice may not be applicable to soil-rock mixtures which degrade under field compaction.

2. Referenced Documents

2.1 ASTM Standards:

- C 127 Test Method for Specific Gravity and Absorption of Coarse Aggregate²
- D 698 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-lb (2.49-kg) Rammer and 12-in. (305-mm) Drop³
- D 1556 Test Method for Density of Soil In Place by the Sand-Cone Method³
- D 1557 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop³
- D 2167 Test Method for Density of Soil In Place by the Rubber-Balloon Method³
- D 2216 Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures³
- D 2922 Test Methods for Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)³
- D 3017 Test Method for Moisture Content of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)³
- D 4253 Test Methods for Maximum Index Density of Soils Using a Vibratory Table³
- E 11 Specification for Wire-Cloth Sieves for Testing Purposes⁴

3. Significance and Use

3.1 Compaction tests on soils performed in accordance with Test Methods D 698, D 1557, and D 4253 place limitations on the maximum size of particles that may be used in the test. If a soil contains cobbles or gravel, or both, test options may be selected which result in particles retained on a specific sieve being discarded (for example the No. 4 (4.75-mm) or the $\frac{1}{4}$ -in. (19-mm) or other appropriate size), and the test performed on the finer fraction. The unit weight-water content relations determined by the tests reflect the characteristics of the actual material tested, and not the characteristics of the total soil material from which the test specimen was obtained.

3.2 It is common engineering practice to use laboratory compaction tests for the design, specification, and construction control of soils used in earth construction. If a soil used in construction contains large particles, and only the finer

¹ This practice is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.03 on Texture, Plasticity, and Density Characteristics of Soils.

Current edition approved July 31, 1987. Published September 1987.

² Annual Book of ASTM Standards, Vol 04.02.

³ Annual Book of ASTM Standards, Vol 04.08.

⁴ Annual Book of ASTM Standards, Vol 14.02.

fraction is used for laboratory tests, some method of correcting the laboratory test results to reflect the characteristics of the total soil is needed. This practice provides a mathematical equation for correcting the unit weight and water content of the tested finer fraction of a soil, to determine the unit weight and water content of the total soil.

3.3 Similarly, this practice provides a means for correcting the unit weight and water content of field compacted samples of the total soil, so that values can be compared with those for a laboratory compacted finer fraction.

NOTE—When this practice is used for construction control, the using agency should specify whether the maximum unit weight value used for reference is the unit weight including oversize fraction or the unit weight of the finer fraction. Calculated values of percent compaction based on this correction practice will vary depending on which unit weight value is used for reference.

4. Procedure

4.1 Correction of Unit Weight and Water Content for Total Sample:

4.1.1 Prepare the sample from which compaction test specimens are to be taken in accordance with provisions of Test Methods D 698, D 1557, or D 4253. Determine the mass of the moist fine fraction of the sample and the mass of the moist oversize (plus No. 4 or plus 3/4-in., or other appropriate size) fraction of the total sample. If Test Method D 4253 is used, the correction for water content does not apply. Determine the water content of each of the two fractions in accordance with Method D 2216. Calculate the mass of the dry finer fraction and the dry oversize fraction as follows:

$$M_D = M_M / (1 + w)$$

where:

M_D = mass of the dry material (finer or oversize fraction), g,
 M_M = mass of the moist material (finer or oversize fraction), g, and
 w = water content of the respective finer or oversize fractions expressed as a decimal.

4.1.2 Calculate the percentage of the finer fraction and of the oversize fraction of the sample by dry weight as follows:

$$P_F = 100 M_{DF} / (M_{DF} + M_{DC})$$

and

$$P_C = 100 M_{DC} / (M_{DF} + M_{DC})$$

where:

P_F = percent of finer fraction by weight,
 P_C = percent of oversize fraction by weight,
 M_{DF} = mass of dry finer fraction, and
 M_{DC} = mass of dry oversize fraction.

4.1.3 Determine the bulk specific gravity (G_M) of the oversize fraction as set forth in Test Method C 127.

4.1.4 Calculate the corrected water content and corrected dry unit weight of the total material (combined finer and oversize fractions), as follows:

$$C_w = (w_F P_F + w_C P_C)$$

where:

C_w = corrected water content of combined and oversize fractions,
 w_F = water content of finer fraction expressed as a decimal,

w_C = water content of oversize fraction expressed as a decimal,

and

$$C\delta_D = 100 \delta_F G_M \delta_w / (\delta_F P_C + G_M \delta_w P_F)$$

where:

$C\delta_D$ = corrected unit dry weight of the total material (combined finer and oversize fractions),

G_M = bulk specific gravity,

δ_F = dry unit weight of the finer fraction, and

δ_w = unit weight of water (62.42 lbf/ft³ or 9.802 kN/m³).

4.2 Correction of Unit Weight and Water Content for Finer Fraction of a Soil Sample:

4.2.1 When it is desired to compare the unit weight and water content of a field-compacted soil containing oversize particles with the results of laboratory compaction tests on the finer fraction, the following procedure may be used:

4.2.1.1 A sample of the total material is obtained in the field at the desired test location in conjunction with a unit dry weight (δ_D) and water content (w) determination by methods such as Test Methods D 1556, D 2167, or D 2922 and D 3017 combined. Since this practice is usually used for materials containing coarse gravel and cobble size particles, special care should be taken to assure that the volume of material sampled is adequate to accurately represent the material in the field at the test location.

4.2.1.2 Remove the oversize particles (plus No. 4 or 3/4-in., or other appropriate size) from the field sample and determine the percentage of oversize particles in the total sample. If, in the laboratory testing of the materials, the bulk specific gravity and the water content of the oversize particles have been determined, these values may be used in the calculations. Otherwise, it will be necessary to determine the bulk specific gravity by Test Method C 127.

4.2.1.3 Calculate the water content of the finer fraction of the field sample as follows:

$$w_F = (100 w - w_C P_C) / P_F$$

4.2.1.4 Calculate the dry unit weight of the finer fraction of the field sample as follows:

$$\delta_F = \delta_D G_M \delta_w P_F / (100 G_M \delta_w - \delta_D P_C)$$

5. Report

5.1 The report shall contain the following:

5.1.1 The identification of the sample.

5.1.2 The method used in compacting the sample.

5.1.3 The method used to obtain the field sample (as appropriate).

5.1.4 The sieve size used to separate the oversize particles.

5.1.5 The percentage by weight of oversize particles.

5.1.6 The value of bulk specific gravity, G_M , used in the calculations.

5.1.7 For laboratory compacted samples, the dry unit weight and water content of the finer fraction, and the corrected value for the total sample.

5.1.8 For samples obtained in the field, the dry unit weight and water content of the total sample, and the corrected value for the finer fraction.

APPENDIX

(Nonmandatory Information)

X1. RATIONALE

X1.1 The calculations to correct the unit weight and water content of soil samples containing oversize particles are based on the premise that the percentage of such particles is small enough that they do not interfere with the compaction of the finer fraction during the compaction process. Thus, the finer fraction of the soil will achieve the same unit weight and water content with the oversize particles absent as with them present. The equation used for the calculation of unit weight is based on the work of Ziegler.⁵

X1.2 Tests conducted by the Bureau of Reclamation^{6,7}

and the Waterways Experiment Station⁸ indicate that the limiting oversize particle (plus No. 4 sieve) content may be as high as 40 %. It is necessary, in evaluating such studies to ensure that the gradation of the finer fraction does not change as the oversize particle content changes. The upper limit of oversize particles in this practice has been set at 40 % of the plus No. 4 material and 30 % of the plus 3/4-in. material.

X1.3 It is assumed that in a moist, compacted sample of soil containing oversize particles, those oversize particles absorb moisture from the surrounding medium. The maximum water content that the oversize particles can achieve approaches as a limit the percent absorption of the oversize fraction, as measured by Test Method C 127. The water content of the oversize fraction also may be measured directly by Method D 2216.

⁵ Ziegler, E. J., "Effect of Materials Retained on the No. 4 Sieve on the Compaction Test of Soil," *Proceedings, Highway Research Board*, Vol. 28, 1948, pp 409-414.

⁶ Merriam, J., "Research on Compaction Control Testing for Gravelly Soils," *Earth Research Program Report EM662*, U.S. Bureau of Reclamation, Denver, CO, August 1963.

⁷ Holtz, W. G., and Lowitz, C. A., "Compaction Characteristics of Gravelly Soils," *U.S. Bureau of Reclamation, Earth Laboratory Report No. 509*, Denver, CO, September 1957.

⁸ Donaghe, R. T., and Townsend, F. C., "Compaction Characteristics of Earth-Rock Mixtures," Report 2 "Blended Material," Misc. Paper S-73-25, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MI, August 1975.

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This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, 1916 Race St., Philadelphia, PA 19103.

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102	(2) S/C NO.: 614	(5) Pg 1 OF 3	(6) DATE 9/14/98
(3) S/C TITLE: Southern Waste Unit Excavation / On Site Disposal Facility Phase II		(11) RCI NO.: RCI-20102-030	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN/TITLE: Placement of Bentonite Granules Between GCL Panels	
(7) DOCUMENTS AFFECTED Technical Specifications		(7) DOCUMENT NOS. 20102-TS-0001	(7) REV. 1
			(8) OTHER Section 02772

(9) ☒ RCI - INQUIRY ☐ USQD SCREENING BY PROJECT ENGINEER(9) ☐ DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

The technical specifications do not directly address the use of bentonite granules between the overlapped GCL panels immediately following deployment of these panels. Attached is a copy of the Bentomat/Claymax Installation Guidelines which addresses seaming of the GCL. Petro Environmental believes that there is room for interpretation as to when bentonite granules should be placed between the GCL panels, as it is not explicitly stated in paragraph 7. Petro Environmental believes that bentonite-enhanced seams should be constructed when making the tie-in along the south side of the Cell 1/2 Intercell Berm and along toes of slopes (i.e. - at the toe of the East Berm at the floor). Petro Environmental also believes, however, that it is excessive and not necessary to construct bentonite-enhanced seams at every overlapped panel. This procedure was not employed during the Phase I Cell I construction and should not be required for this Phase II work either. This material is supposedly superior to last year's product, as evidenced by conformance and performance testing, so therefore, the use of post-production bentonite during installation is seen as a way for GSE to make additional profits. Some relief to this additional installation requirement would also help to speed up the overall GCL installation process.

(10) REQUESTER: J. Richard Schairbaum
COMPANY: Petro Environmental Technologies, Inc.
DATE: 9/14/98
(12) FCE / PE: James C. Jenkins
DATE: 9/14/98
(13) RESPONSE FOR RCI, IS A DCN REQ'D ☒ NO ☐ YES
(14) FOR DCN: ☐ APPROVED ☐ APPROVED AS NOTED ☒ DISAPPROVED

See Page 2 for Response.

INFORMATION
ONLY

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL: Daniel G. Bodine 18 Sept 98
DATE: 18 Sept 98
(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: NA
(16) PDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEW ARE COMPLETE: (DCN ONLY)
PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE: 10/1/98
DATE: 10/1/98
(21) WORK COMPLETED: (SIGNOFF BY CE OR PE)
PURCHASE REQUISITION REQUIRED: ☐ YES ☒ NO (19)

ORIGINAL Dan

DCI-20102-03-2 P. 2 of 3

- 6.3 The GCL should be placed in the anchor trench such that it covers the entire trench floor but does not extend up the rear trench wall.

7 Seaming

- 7.1 GCL seams are constructed by overlapping their adjacent edges. Care should be taken to ensure that the overlap zone is not contaminated with loose soil or other debris. Supplemental bentonite is required for CETCO Bentomat GCLs but not Claymax 200R or 600CL.
- 7.2 Unless otherwise specified, the minimum dimension of the longitudinal overlap should be 6 inches (150 mm). End-of-roll overlapped seams should be similarly constructed, but the minimum overlap should measure 24 inches (600 mm).
- 7.3 Seams at the ends of the panels should be constructed such that they are shingled in the direction of the grade to prevent the potential for runoff flow to enter the overlap zone.
- 7.4 Bentonite-enhanced seams are constructed first by overlapping the adjacent panels as instructed above, exposing the underlying edge, and then applying a continuous bead or fillet of granular sodium bentonite (supplied with the GCL) along a zone defined by the edge of the underlying panel and the 6-inch (150 mm) line (Figure 3). The minimum application rate at which the bentonite is applied is one quarter pound per lineal foot (0.4 kg/m).

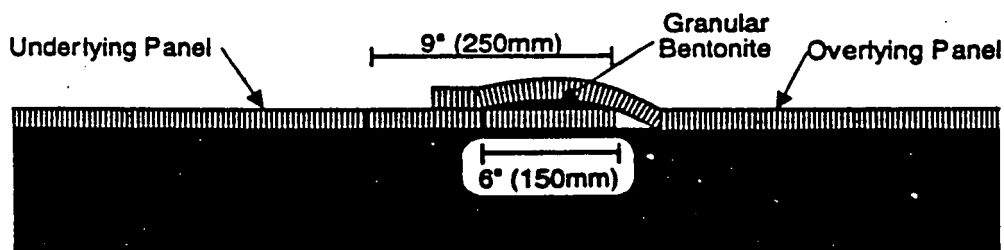


Figure 3. Bentonite-enhanced overlapped seam.

8 Sealing Around Penetrations and Structures

- 8.1 Cutting the GCL should be performed using a sharp utility knife. Frequent blade changes are recommended to avoid irregular tearing of the geotextile components of the GCL during the cutting process. 8.2 The GCL shall be sealed around penetrations and structures

Response to RCI-20102-030R
(Dated 9/14/98, Page 2 of 2)

Paragraph 7.1 of the Bentomat/Claymax Installation Guide states that supplemental bentonite is required for CETCO Bentomat GCLs. This is very clear. Project specifications, Section 02772, Rev. 1, Part 3.04. C. States "Overlap geosynthetic clay liner and cap in strict accordance with the Manufacturer's recommended methods. ..."

Therefore, follow the project specifications and manufacturers recommendations by overlapping and shingling in the direction of the grade and installing the continuous bead of granular sodium bentonite.

*Daniel Babbie P.E.
18 September 98*

DOCUMENT ROUTING SHEET
ON-SITE DISPOSAL FACILITY
PROJECT NO. 20102

2064

Date: 9/16/98

Project/Contract/P.O. Name OSDF - Phase II Project/Contract/P.O. No. FSC-614

Document Title _____

Review the attached Document/Submittal/DCN and return to: [Signature] DUE DATE 9/21/98

Submittal/DCN No. 302 Date: 9/14/98 Submittal/DCN Title Placement of Bentonite Grout between GCL Panels.

Routing Sequence	Reviewing Discipline	Review To Be Completed By	Review Completed By	Document/DCN		Summittal Status				Remarks
				Approved	Disapproved	"A"	"B"	"C"	"10"	
①	Engineering	<u>9/17</u>			<u>COV/9/17</u>					THE MANUFACTURER REQUIRES SUPPLEMENTAL BENTONITE FOR CETO BENTONITE. LAST YEAR'S GCL (BENTONITE) DID NOT REQUIRE BENTONITE FILLING.
Reviewer:	Construction	<u>OSW/9/17</u>	<u>9/17/98</u>		<u>9/17/98</u>					
Reviewer:	Safety									
Reviewer:	Quality									
Reviewer:	Procurement									
Reviewer:	Project Controls									
Reviewer:	Envir. Compliance									
③	Proc. Manager	<u>9/21</u>	<u>9/18/98</u>		<u>9/18/98</u>					
Reviewer:	Estimating									
Reviewer:	Title III A-F	<u>9/18</u>	<u>✓</u>							
Reviewer:										
Reviewer:										
Reviewer:										

Special Instruction/Additional Comments:

Document Originator/DCN Requester: Petro
Sent to ECDC: Date: 9/18/98
Submittal/DCN Sent to Contractor: Date: _____

Status	Definition
A	Reviewed
B	Reviewed, proceed with work incorporating comments. Change submittal as noted and resubmit
C	Change submittal as noted and resubmit
10	Information only

Udaycard

000018

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) WP / WO NO.: 20102	(2) S/C NO.: 614	(5) Pg 1 OF 1	(6) DATE 9/14/98
(3) S/C TITLE: Southern Waste Unit Excavation / On Site Disposal Facility Phase II		(11) RCI NO.: RCI-20102-0321	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>	(4A) RCI/DCN/TITLE: Construction of Cell 2 Clay Wedge		(11) DCN NO.:
(7) DOCUMENTS AFFECTED Technical Specifications	(7) DOCUMENT NOS. 20102-TS-0001	(7) REV. 1	(8) OTHER Section 02225
Drawing 90X-6000-00215	Sheet G-22B	2	

(9) ☒ RCI - INQUIRY ☐ USQD SCREENING BY PROJECT ENGINEER(9) ☐ DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

Petro Environmental is requesting permission to place clean processed clay material during construction of the clay wedge without the use of the soil stabilizer. This would prevent potential damage to the underlying geosynthetics by the soil stabilizer. Petro Environment would construct the clay wedge using a LGP dozer to place the material and to scarify the material (via tracking) between lifts. A smooth drum roller will be used to seal off each lift of material at the end of each day and to provide a compactive effort as needed or required. After 2-ft. of clay wedge material has been placed, then Petro Environmental will continue to place material using a LGP dozer, but switch to use of an 815B Compactor to provide the compactive effort required. A smooth drum roller will still be used to seal off the clay surface at the end of each work day.

(10) REQUESTER: J. Richard Schairbaum	COMPANY: Petro Environmental Technologies, Inc.	DATE: 9/14/98	(12) FCE / PE JAMES C. JENKINS	DA
(13) RESPONSE FOR RCI, IS A DCN REQ'D <input checked="" type="checkbox"/> NO <input type="checkbox"/> YES		(14) FOR DCN: <input type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED		

See Page 2 for Response

INFORMATION
ONLY

ORIGINAL

RCI - DCN ACCEPTANCE	
(15) DESIGN ORGANIZATION APPROVAL: Daniel Bodine	DATE: 21 Sept 98
<input type="checkbox"/> FIT <input type="checkbox"/> FORM <input type="checkbox"/> FUNCTION	NA
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEW ARE COMPLETE: (DCN ONLY)	
PERFORMANCE GRADE: (17) NA.	
(18) CONSTRUCTION CONCURRENCE: PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO (19)	DATE: 09/24/98
(21) WORK COMPLETED: (SIGNOFF BY CE OR PE)	

Dan

Response to RCI-20102-032R
(Dated 9/14/98, Page 2 of 2)

Existing wording in the Phase II Constructions Documents permits the construction of the clay in general agreement with Petro's request. Note that the requirements of Note 6 on Drawing 90X-6000-00215, Rev. 2, must be met and that a walk behind or remote controlled compactor, such as the BOMAG BW 650T, may be required. Compaction of the first lift shall be completed without the use of vibratory force. Also, please verify that the D5LGP or D6LGP are dozers with ground pressures less than 5 psi and indicate which dozer you plan to use.

Daniel Bodur
21 Sept 98

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102		(2) S/C NO.: 614		(5) Pg 1 OF 1	(6) DATE 10/17/98
RCI TITLE: Southern Waste Unit Excavation / On Site Disposal Facility Phase II				(11) RCI NO.: RCI-20102-036R	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN/TITLE: Clarification of Protective Layer Material		(11) DCN NO.:	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV.	(8) OTHER	
Construction Drawings		90X-6000-G-00215	2	Note 3	
		90X-6000-G-00216	2	Note 5	
Impacted Material Placement Plan		90X-6000-G-00217	2	Note 2	
		20100-PL-007	1	Sections 3.2, 7.2.1	

(9) ☒ RCI - INQUIRY ☐ USQD SCREENING BY PROJECT ENGINEER(9) ☐ DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

There is a discrepancy between the classification of acceptable materials to be used for the Protective Layer between the IMPP and the Construction Drawings. In the IMPP, the following statements are noted: Section 3.2: ... "the soil used for the protective layer shall be either: (i) on-site till material ... or a (ii) granular drainage material ..."; Section 7.2.1: "As indicated in Section 3.2 of the IMP Plan, the protective layer and contouring layers shall consist of on-site till or flyash ...". The Construction Drawings noted above and their corresponding notes state: "Protective layer shall consist of impacted or non-impacted granular material in impacted runoff catchment area and impacted *non-granular* material in remaining areas.

There is an obvious discrepancy between the IMPP and the Construction Drawing Notes. In accordance with Section SC-3, Order of Precedence, under Part 4, Special Terms and Conditions, technical specifications take precedence over construction drawings. Following this order of precedence, the descriptions offered in the IMPP shall take priority, thereby permitting Petro Environmental to place flyash into Cell 2 for the 1-ft. Protective Layer. This is the material Petro Environmental wishes to utilize during the construction of this layer in accordance with the IMPP. Please clarify this discrepancy.

(10) REQUESTER: J. Richard Schairbaum COMPANY: Petro Environmental Technologies, Inc. DATE: 10/17/98 (12) FCE / PE DON COETZ DATE: 10/28/98
JAMES C. JENKINS J.C. Jenkins 10/29/98

(13) RESPONSE FOR RCI, IS A DCN REQ'D ☒ NO ☐ YES(14) FOR DCN: ☐ APPROVED ☐ APPROVED AS NOTED ☐ DISAPPROVED

See page 2 for Response

INFORMATION
ONLY

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL: Daniel Bodine 26 October 1998 DATE: (20) CHARGE NO. FOR CAD SERVICES TO INCORPORATE N.A.
Dan Bodine ☐ FIT ☐ FORM ☐ FUNCTION

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEW ARE COMPLETE: (DCN ONLY) DATE: N.A.

PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE: DATE: (21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:
PURCHASE REQUESTION REQUIRED: ☒ YES ☒ NO (19)

Response to RCI-20102-036R
(Dated 10/26/98, Page 2 of 2)

Section 3.2 provides the base design description of the protective layer material. Section 7.2.1 recognizes that the onsite fly ash materials may meet the particle size requirements and may be used as an acceptable material for the protective layer. This was explained by GeoSyntec in the October 14, 1998 scheduling meeting with FDF Engineering, Construction and Petro.

The construction drawing notes do state that the protective layer shall consists of impacted non-impacted non-granular material in the Cell 2 area (excludes Cell 3 side) except for the runoff catchment area. This was done to require special approval to use impacted granular materials for the protective layer. At the October 14, 1998 meeting, and confirmed with the Construction Manager on October 16, 1998, GeoSyntec verbally gave approval to use ash material for the protective layer subject to the size, placement and compaction requirements, and final approval of the Construction Manager.

Ranul Bortin
26 October 1998

DOCUMENT ROUTING SHEET
ON-SITE DISPOSAL FACILITY
PROJECT NO. 20102

Date: 10/20/98

Project/Contract/P.O. Name OSDF Phase II Project/Contract/P.O. No. FS C 614

Document Title _____

Review the attached Document/Submittal/DCN and return to: Enbina DUE DATE 10/23/98

Submittal/DCN No. 20102-036R Date: 10/17/98 Submittal/DCN Title Clarification of Protective Layer

Routing Sequence	Reviewing Discipline	Review To Be Completed By	Review Completed By	Document/DCN		Summittal Status				Remarks
				Approved	Disapproved	"A"	"B"	"C"	"10"	
①	Engineering	<u>10/21</u>	<u>10-21</u>	<u>BS</u>						<u>Geogrite 4' bold section 13</u>
Reviewer:	Construction									
Reviewer:	Safety									
Reviewer:	Quality									
Reviewer:	Procurement									
Reviewer:	Project Controls									
Reviewer:	Envir. Compliance									
③	Proj. Manager	<u>10/23</u>								
Reviewer:	Estimating									
Reviewer:	Title III A-E	<u>10/22</u>	<u>10/24</u>	<u>ROS</u>						<u>RGT</u>
Reviewer:										
Reviewer:										

Special Instruction/Additional Comments: Confer with Geogrite (Bodine)

Document Originator/DCN Requester: RGT Petro

Sent to ECDC: Date: _____

Submittal/DCN Sent to Contractor: Date: _____

Status	Definition
A	Reviewed
B	Reviewed, proceed with work incorporating comments. Change submittal as noted and resubmit
C	Change submittal as noted and resubmit
10	Information only

a:Udaycard

000023

APPENDIX T:

DESIGN CHANGE NOTIFICATION (DCN)

OSDF Phase II Cell 2 (20102)

OSDF Phase I Cell 1 (1702)

Leachate Conveyance System (1700)

2064

OSDF Phase II Cell 2 (20102)

000025

Design Change Notices

Fernald On-Site Disposal Facility, Phase Two Activities

Approved, Disapproved or Voided	DCN No.	DCN Title	Date	Requestor	Design Organization Approval/Disapproval	Construction Concurrence	Work Completed
Approved	20102-001	Engineering Design Changes Incorporated in Subcontract Amendments	7-Jan-98	Maureen Richard	Ken Cargill	Don Goetz 1/13/98	
Approved	20102-002	Borrow Area Sedimentation Basin Excavation Clarification	8-Jan-98	Maureen Richard	Ken Cargill	Don Goetz 1/13/98	
Approved	20102-003	CRB Questions about GML, GCL & Geotextile Specifications	18-Feb-98	Rick Heath	Ken Cargill	N/A	
Approved	20402-004	Revised Active Flyash Pile Grading Plan	10-Mar-98	Jim Turner	Carlton Schroeder	Frank Flack 4/16/98	*
Approved	20402-005	Changes per Amendment 6 and CC: Mail	2-Apr-98	Anthony Klimek	Carlton Schroeder	Frank Flack 5/8/98	*
Approved	20402-006	General Update of Excavation Design	3-Apr-98	Anthony Klimek	Carlton Schroeder	Frank Flack 5/8/98	*
Approved	20102-007	Delete T-96 Fire and Evacuation OSDF Support Facilities	16-Apr-98	Lou Wehlitz	Surinder Kumar	Lou Wehlitz 4/27/98	
Approved	20102-008	GCL Laboratory QC Testing	22-Apr-98	Dan Bodine	Dan Bodine	Lou Wehlitz	
Approved	20102-009	GCL Peel Strength Testing Unit	22-Apr-98	Dan Bodine	Dan Bodine	Lou Wehlitz 4/27/98	
Approved	20102-010	Air Pressure Testing	5-May-98	Dan Bodine	Dan Bodine	Don Goetz 5/6/98	
Approved	20102-011	Significant Digit for Geotextile Filter AOS	6-May-98	Dan Bodine	Dan Bodine	Don Goetz 5/6/98	
VOID	20102-012	Deletion of Intergraph Microstation Requirements	19-May-98	Rick Schairbaum	Dan Bodine	Don Goetz 5/27/98	
Approved	20102-013	Rerouting of Borrow Area Haul Road	3-Jun-98	Maureen Richard	Dan Bodine	Don Goetz 6/15/98	
Approved	20102-014	Revision to GCL Properties and Testing Requirements	19-May-98	Rick Heath	Ken Cargill	N/A	
Approved	20402-015	Operation and Maintenance of Transfer Line System	20-May-98	Anthony Klimek	Carlton Schroeder	Lee McDaniel 5/22/98	*
Approved	20402-016	Above WAC Areas in SP-5	3-Jun-98	Anthony Klimek	Carlton Schroeder	Lee McDaniel 6/9/98	*
Approved	20102-017	Conditioning for Geomembrane Conformance Test Samples	3-Jun-98	Dan Bodine	Dan Bodine	Don Goetz 6/7/98	
VOID	20402-018	Deletion of Intergraph Microstation Requirement	19-May-98	Rick Schairbaum	Carlton Schroeder	Frank Flack 6/11/98	*

* Not Applicable to Cell 2 Construction

WC indicates the work complete DCN is included

2064

Design Change Notices
Fernald On-Site Disposal Facility, Phase Two Activities

Approved, Disapproved or Voided	DCN No.	DCN Title	Date	Requestor	Design Organization Approval/Disapproval	Construction Concurrence	Work Completed
DISAPPROVED	20102-019	Impacted Material Compaction Procedures	8-Jun-98	Dan Bodine	N/A	N/A	*
DISAPPROVED	20102-020	Impacted Material Placement Procedures	9-Jun-98	Dan Bodine	N/A	N/A	*
Approved	20402-021	Upgrade Electrical Service to SWU Equipment Wash Facility	11-Jun-98	Anthony Klimek	Carlton Schroeder	Frank Flack 7/22/98	*
DISAPPROVED	20102-022	Changes to Impacted Material Placement Plan (General Text)	10-Jun-98	John Berretz	N/A	N/A	*
DISAPPROVED	20102-023	Impacted Material Placement Quality Assurance Plan	15-Jun-98	Dan Bodine	N/A	N/A	*
Approved	20402-024	Replace Section 2900 (Seeding)	17-Jun-98	Anthony Klimek	Carlton Schroeder	Frank Flack 6/30/98	*
VOID	20402-025	Above-WAC Area Modifications	17-Jun-98	Anthony Klimek	Carlton Schroeder	Frank Flack 6/25/98	*
Approved	20402-026	SWU Drainage Modifications	26-Aug-98	Tony Sneider	Carlton Schroeder	Lee McDaniel 6/26/98	*
Approved	20102-027	CQA Plan Test Standards and Procedures	22-Jun-98	Kwasi Badu-Tweneboah	Dan Bodine	Don Goetz 6/24/98	
Approved	20402-028	Impacted Stockpile Excavation/Above WAC Sump Development/Sediment Sampling/Disturbed Area Stabilization	17-Jun-98	Anthony Klimek	Carlton Schroeder	Frank Flack 6/30/98	*
Approved	20102-029	Use of Straw Bales for Erosion and Sediment Control	30-Jun-98	Kwasi Badu-Tweneboah	Dan Bodine	Lou Wehlitz 6/30/98	
Approved	20102-030	Required GCL Property Values	30-Jun-98	Kwasi Badu-Tweneboah	Dan Bodine	Lou Wehlitz 6/30/98	
Approved	20102-031	Phase II Former North Entrance Road Removal	14-May-98	Maureen Richard	Dan Bodine/ Uday Kumthekar	Lou Wehlitz 6/30/98	
Approved	20402-032	Construction Trailers - 480 Volt Feed	1-Jul-98	Christopher Neumann	Carlton Schroeder	Lee McDaniel 7/1/98	*
Approved	20102-033	Nuclear Density Correlation	1-Jul-98	Kwasi Badu-Tweneboah	Dan Bodine	Lou Wehlitz 7/6/98	*
Approved	20102-034	Borrow Area Haul Road	1-Jul-98	Kwasi Badu-Tweneboah	Dan Bodine	Don Goetz 7/15/98	

Design Change Notices
Fernald On-Site Disposal Facility, Phase Two Activities

Approved, Disapproved or Voids	DCN No.	DCN Title	Date	Requestor	Design Organization Approval/Disapproval	Construction Concurrence	Work Completed
Approved	20402-035	Deletion of Dumped Rock from Interceptor Ditch #1	1-Jul-98	Anthony Klimek	Carlton Schroeder	Frank Flack 7/7/98	*
Approved	20102-036	Clarification to Drawings and Specifications	10-Jun-98	Dan Bodine	Dan Bodine	Don Goetz 7/6/98	
VOID	20102-037	Geotextile Backings for GCL	8-Jul-98	Kwasi Badu- Tweneboah	Dan Bodine	N/A	
Approved	20102-038	Control Point Discrepancies	23-Jun-98	Steve Brandstetter	Dan Bodine	Don Goetz 7/13/98	
Approved	20102-039	East Drainage Channel, Cell 3	8-Jul-98	Steve Brandstetter	Dan Bodine Kwasi Badu-Tweneboah	Don Goetz 7/13/98	
Approved	20102-040	Replace Section 02930, Vegetation	15-Jul-98	Jim Jenkins	Dan Bodine	Don Goetz	
Approved	20402-041	Construct Interceptor Ditch Concurrently with IFP Excavation	13-Jul-98	Steve Brandstetter	Carlton Schroeder	Frank Flack 7/20/98	*
Approved	20102-042	Corrections to Drawings	16-Jul-98	Kwasi Badu- Tweneboah	Dan Bodine	Don Goetz 7/23/98	
Approved	20402-043	SP-5 North Drainage Grading	27-Jul-98	Marshall Linton	Carlton Schroeder	Frank Flack 7/28/98	*
Approved	20102-044	Geomembrane Thickness Testing Method	5-Aug-98	Kwasi Badu- Tweneboah	Dan Bodine	Don Goetz 8/11/98	
Approved	20102-045	Required Properties and Ranges HDPE Pipe and Fittings	5-Aug-98	Kwasi Badu- Tweneboah	Dan Bodine	Don Goetz 8/11/98	
VOID	20402-046	HDPE Lining and Interceptor Ditch #1	5-Aug-98	Bruce Schweitzer	N/A	N/A	*
Approved	20402-047	Interceptor Ditch #1 Tie-In with Existing Ditch #3	6-Aug-98	Marshall Linton	Carlton Schroeder	Frank Flack 8/11/98	*
Approved	20402-048	SWU Equipment Wash Facility Sediment Removal	12-Aug-98	Frank Flack	Carlton Schroeder	Lee McDaniel 8/18/98	*
Approved	20402-049	Brick Removal/Erosion Control Mat Staples	12-Aug-98	Frank Flack	Carlton Schroeder	Lee McDaniel 8/18/98	*
Approved	20402-050	Modification of DCN 20402-026	19-Aug-98	Mary Eleton	Kenneth Gerard	Frank Flack 8/24/98	*
Approved	20402-051	Fertilizer and Seeding Clarification	11-Aug-98	Rick Schairbaum	Kenneth Gerard	Frank Flack 8/24/98	*
Approved	20102-052	Fertilizer and Seeding Clarification	11-Aug-98	Rick Schairbaum	Dan Bodine	Don Goetz 8/26/98	

WC indicates the work complete DCN is included

Design Change Notices
Fernald On-Site Disposal Facility, Phase Two Activities

Approved, Disapproved or Voids	DCN No.	DCN Title	Date	Requestor	Design Organization Approval/Disapproval	Construction Concurrence	Work Completed
Approved	20402-053	Silt Fence at Equipment Wash	31-Aug-98	Jennifer Blankemeyer	Carlton Schroeder	Frank Flack 9/1/98	*
Approved	20402-054	Above-WAC Excavation Elevation	31-Aug-98	Marshall Linton	Kenneth Gerard	Frank Flack 9/4/98	*
Approved	20402-055	Equipment Wash Grating Repair	2-Sep-98	Christopher Neumann	Kenneth Gerard	Frank Flack 9/3/98	*
Approved	20102-056	Extrudate Welding Rod for GML	8-Sep-98	Dan Bodine	Dan Bodine	Don Goetz 9/10/98	
Approved	20102-057	Nuclear Density Correlation CQA Plan	9-Sep-98	Dan Bodine	Dan Bodine	Don Goetz 9/15/98	
Approved	20102-058	Preparation of Trial Seams for HDPE Liner	14-Sep-98	Rick Schairbaum	Dan Bodine	Don Goetz 9/15/98	
Approved	20102-059	Borrow Area - Additional Clay Material	17-Sep-98	Jim Jenkins	Dan Bodine	Don Goetz 9/18/98	
Approved	20102-060	Sacrificial Geomembrane	28-Sep-98	Dan Bodine	Dan Bodine	Don Goetz 9/29/98	
Approved	20402-061	Mulch Tactifier and Fertilizer Modifications	24-Sep-98	Jennifer Blankemeyer	Carlton Schroeder	Frank Flack 9/29/98	*
Approved	20402-062	Excavation Tolerance	6-Oct-98	Marshall Linton	Kenneth Gerard	Lee McDaniel 10/9/98	*
Approved	20402-063	Seeding Clarification	20-Oct-98	Jennifer Blankemeyer	Carlton Schroeder	Frank Flack 10/22/98	*
Approved	20402-064	HDPE Liner for Interceptor Ditch Tie-In	14-Oct-98	Fred Wilson	Carlton Schroeder	Frank Flack 10/20/98	*
Approved	20402-065	OEPA Seeding for IFP	26-Oct-98	Don Goetz	Carlton Schroeder	Frank Flack 10/29/98	*
Approved	20402-066	Excavation of Active Flyash Pile	26-Oct-98	Frank Flack	Carlton Schroeder	Frank Flack 10/29/98	*
Approved	20102-068	Cell 2 Access Ramp Construction	6-Nov-98	Rick Schairbaum	Dan Bodine		
Approved	20402-069	West End of Interceptor Ditch 2	17-Nov-98	Frank Flack	Carlton Schroeder	Frank Flack 2 Dec 98	*
Approved	20102-070	Surfactant Use on Protective Layer in Cell 3	20-Nov-98	Rick Schairbaum	Dan Bodine	Don Goetz 30 Nov 98	

Design Change Notices
Fernald On-Site Disposal Facility, Phase Two Activities

Approved, Disapproved or Voided	DCN No.	DCN Title	Date	Requestor	Design Organization Approval/Disapproval	Construction Concurrence	Work Completed
Approved	20102-071	Backfill Requirements for Anchor Trenches	2-Dec-98	Dan Bodine	Dan Bodine		

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ATTACHMENT A TO DCN 1702-051 FOR PHASE 2 CONTRACT AMENDMENT NO. 2

OSDF - PHASE II DRAWINGS			JUSTIFICATION FOR ACTION
10	DWG 90X-8000-G-00202 SHEET G-28	1. Add coordinates N 483,999.84 E 1,381,300.57° for termination of former North Entrance Road north of Cell 1.	1. Eases construction for Contractor. <i>Confused. If intent is to set</i>
11	DWG 90X-8000-G-00207 SHEET G-10A	1. Add leader arrow and text "See Note 5" pointing to Eastern drainage channel. 2. Add Note 5 to read: "5. Storm water runoff from the surface of the area to be capped shall be diverted to the impacted runoff catchment area until the 2-foot thick, clay cap <i>compacted</i> is constructed." 3. Show 3.5:1 max. slope symbol from the Extant of Final Cover System Temporary Termination <i>from the Extant of Final Cover System Temporary Termination</i> extending south.	1. Clarifies Note 5 to be added in item 2. 2. Prevents impacted runoff from exiting the cell area. 3. Clarifies Interim final cover system topography.
12	DWG 90X-8000-00215 SHEET G-22B	1. Change Liner System Component Summary Geosynthetics title to read: "Geosynthetics (See Note 10)." 2. Add Note 10 to read: "Geosynthetics will be supplied by Fluor Daniel Fernald."	1. Clarifies Table on drawing so Contractor knows what he has to furnish. 2. Tells Contractor what he has to furnish.
13	DWG 90X-8000-G-00216 SHEET G-23B	1. Detail 20: Change "7" (max) (Note 7) beneath Intercell berm to "Varies" <i>(Note 7)</i> 2. Detail 20, Detail 21 and Detail 23: Label Protective Layers as "Granular Protective Layer" and "Non-impacted Protective Layer" <i>Impacted Non-Granular, Impacted or Non-Impacted Granular</i> according to the hatch pattern.	1. Dimension beneath Intercell berm not always the same. 2. Clarifies type of material to be used for Protective Layer construction.
14	DWG 90X-8000-G-00217 SHEET G-24B	1. Detail B, C, D: Where leachate pipes extend outside of compacted clay liner to the west, show pipe embedment fill extending 7 +/- 1-inch above pipe.	1. Incorporates Phase 1 DCN 1702-032 into Phase 2.
15	DWG 90X-8000-G-00223 SHEET G-40B	1. Detail A: Change detail to show soil bentonite plug extending minimum 12-inches over top of pipe. The bentonite plug shall extend at least 12-inches above pipe and at least 6-inches above embedment fill. 2. Detail B: Change detail to extend pipe embedment fill to 7 +/- 1-inch over top of solid pipe. 3. Detail 42: Show pipe embedment fill extending 7 +/- 1-inch above pipe. Change to show soil bentonite plug extending minimum 12-inches over top of pipe. Plug shall extend at least 12-inches above pipe and at least 6-inches above pipe embedment fill.	1. Incorporates Phase 1 DCN 1702-032 into Phase 2. 2. Incorporates Phase 1 DCN 1702-032 into Phase 2. 3. Incorporates Phase 1 DCN 1702-032 into Phase 2.
TECHNICAL SPECIFICATIONS			
16	SECTION 02200	1. 3.07.E. Change second sentence to read: Suitable soil exhibiting pumping or developing ruts more than two inches in depth shall be removed to a minimum depth of 1-foot or dried in place by a method approved by the Construction Manager.	1. Clarifies wording to read as a complete sentence.

?
benchmark,
then show
benchmark.

Non-Impacted Non-Granular

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17	SECTION 02215	1. 2.01.B. Delete: "... and gravity drainage inlet structures..."	1. Gravity inlet structures deleted from Phase 2 scope.
18	SECTION 02225	1. 3.02.D. Change last sentence to read: "Rescreen this processed material."	1. Clarifies wording to read as a complete sentence.
19	SECTION 02250	1. 3.01.E. Delete "thoroughly" from the first sentence. 2. 3.01.E. Add second sentence to read: "Moisture condition the soil in preceding lift in accordance with this section."	1. Clarifies ambiguity of sentence. 2. Clarifies requirements for vegetative layer construction.
20	SECTION 02271	1. 1.04.A. Change first sentence to read: "Submit the following to the Construction Manager with the Surface Water Management and Erosion Control Plan specified in Section 02270, within 15 calendar days from Notice to Proceed for review and approval."	1. Clarifies when information is to be submitted to the Construction Manager.
21	SECTION 02712	1. 2.01.A. Delete "relatively".	1. Clarifies ambiguity of sentence.
22	SECTION 02714	1. 3.02.D. Add D. to read: "When approved in writing by the Construction Manager and the geotextile manufacturer an alternate to sewing filter, cushion, and supplemental cushion nonwoven geotextiles is heat seaming using a wedge welder. Heat seaming shall be in accordance with equipment manufacturer's requirements. If "burn out" occurs, the burned out area shall be covered with sufficient overlap as specified and seamed with a hand held welder. If the number of repairs is excessive as deemed by the Construction Manager, the installer shall be required to return to sewing in accordance with specifications."	1. Incorporates Phase 1 DCN 1702-039 into Phase 2.
23	SECTION 02772	3.05.B. Change to read: "Do not drive equipment directly on the geosynthetic clay liner and cap unless approved in writing by the Construction Manager. Damage due to equipment operating on the geosynthetic clay liner and cap shall be repaired or replaced at no additional cost to FDF."	1. Incorporates Phase 1 RCI 1702-007R into Phase 2.
24	SECTION 13000	1. 3.05.F. Change to read: "Haul equipment crossing of North Entrance Road ..." 2. 3.06.B. Change to read: "Install culverts associated with the borrow area haul road and in accordance with Ohio DOT Specifications. Install culverts so that surface water is not impounded in any way by the haul road. Temporary drainage structures shall be in accordance with the SWMEC Plan."	1. Clarifies wording to read as a complete sentence. 2. Maintains surface water drainage and prevents ponding of water along the haul road.
25	SECTION 13006	1. 2.03.D. Change to read: "Furnish one 3/8-inch IPS NPT air pressure test port for each box." 2. 3.02.H. Change to read: "Install 1.25-inch bentonite fill holes at locations shown on the Construction Drawings and fill chamber of each liner penetration box with bentonite granules. After bentonite filling is complete, seal each hole with HDPE extruder placed with extrusion welding equipment as specified in Section 02770."	1. Incorporates Phase 1 DCN 1702-036 into Phase 2. 2. Incorporates Phase 1 DCN 1702-038 into Phase 2.

extrudate

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SOLICITATION NO. F98P157721
SUBCONTRACT NO. FSC 614
AMENDMENT NO. 2
DECEMBER 18, 1997

28	SECTION 13010	<p>1. 1.03 Change title to "REFERENCES". Reletter as follows: "1.04 SUBMITTALS", "1.05 HEALTH AND SAFETY REQUIREMENTS", etc.</p> <p>2. 1.03. Add "A. 40 CFR 281".</p> <p>3. Change "1.04.B." to "1.04.B.9."</p> <p>4. 1.04.B.9. Change to read: "Written plan for decontamination of equipment used for impacted material placement within 30 calendar days from Notice to Proceed."</p> <p>5. 3.02.E. Add new ^{subparagraph} to read: "Impacted material slopes shall not exceed 3.5 (horizontal):1 (vertical)." and reletter article accordingly.</p>	<p>1. Add a reference document that was omitted in error.</p> <p>2. Add a reference document that was omitted in error.</p> <p>3. Moves 1.04.B to different paragraph.</p> <p>4. Includes equipment decon. plan as part of the Impacted Materials Placement Plan to make one submittal.</p> <p>5. Incorporates requirements of the Impacted Material Placement Plan.</p>
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after subparagraph E

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REQUEST FOR CLARIFICATION OF INFORMATION/ DESIGN CHANGE NOTICE.

PROJECT / NO. NO.: **1702-20102** DATE NO.: **FSC-214** DATE OF: **1/8/98**

PROJECT TITLE: **OSDF - PHASE II** PROJECT NO.: **20102-002**

IS RESPONSIBLE DISCIPLINE: **NO MO CO OTHER** PROJECT/DCN TITLE: **Borrow Area Sedimentation Basin Excavation Clarification** DCN NO.: **20102-002**

DOCUMENTS AFFECTED	DOCUMENT NO.	TYPE	NOTES
Technical Specification 13000			
Dwg 90x 6000 G-00209 S+G-13 RVD			

PROJECT RCI - INQUIRY ☐ USDO SCREENING BY PROJECT ENGINEER ☐ DESIGN JUSTIFICATION/EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

In response to bidder's question to be issued in Amendment 5 of Phase 2 Contract, change the following: ☐ Specification 13000 3.02.A should be changed to read "The Borrow Area Sedimentation Basin will not be constructed by this contract. The Borrow Area Sedimentation Basin and outfall structures will be constructed by others and will be available at the beginning of Option A. The Contractor shall limit Borrow Area Excavation and associated soil disturbance to less than five (5) acres. The contractor shall begin excavation on western side of the Borrow Area and proceed east. Erosion and sediment control shall be as specified in the Borrow Area Management Restoration Plan."

REQUESTOR: **William Richard** COMPANY: **1/8/98** DATE: **1/8/98** (13) PCE / PE: **1/8/98** DATE:

(13) RESPONSE: FOR RCI IS A DCN REQ'D? ☐ NO ☐ YES (14) FOR DCN: ☐ APPROVED ☒ APPROVED AS NOTED ☐ DISAPPROVED

Under this contract

ECDC CONTROL ORIGINAL
COPY NO. **C011**

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL: **SWC** DATE: **9 Jan 98** DISCHARGE NO. FOR CADD SERVICES TO INCORPORATE

(16) POF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE (DCN ONLY) DATE: **1/13/98**

PERFORMANCE GRADE: (17) **5**

(18) CONSTRUCTION CONCURRENCE: **01/13/98** DATE: **1/13/98** (19) WORK COMPLETED: (SIGNOFF BY PCE OR PE) DATE:

CHASE REQUESTION REQUIRED: ☐ YES ☒ NO (18)

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REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) WP / WO NO.: 20102		(2) S/C NO.: 159792 R4A 5/26/98 ESC-614	(5) PG OF	(6) DATE: 2/18/98
(3) S/C TITLE: OSDF Phase II			(11) RCI NO.: 20102-001R	(11) DCN NO.: 20102-003
(4) RESPONSIBLE DISCIPLINE: EO MO CO OTHERO		(14A) RCI/DCN TITLE: CRB Questions about GML, GCL & Geotextile specifications		
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
OSDF PH I CONSTRUCTION DOCUMENTS		① 5 sections 02770P-1.02 02714P-1.02 02772P-1.02	0 0 0	
② 02770P ③ 02772P-2.01.65		0 0		
<p>(9) RCI - INQUIRY <input checked="" type="checkbox"/> USED SCREENING BY PROJECT ENGINEER (9) DCN JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE</p> <p>① REFERENCE REFERENCE TO PART 9 NOT REQUIRED FOR MATERIAL PROCUREMENT</p> <p>② TABLE 2770-1 REFERS TO GEOMEMBRANE SHEET THE REQUIRED SPECIFIC GRAVITY WITH ADDITIVES IS 0.94. THE SPECIFIC GRAVITY OF 0.935 REFERS TO HDPE RESIN. in Section 02770, para 2.01 B.</p> <p>③ TESTING REQUIREMENTS IN 02772-201 (G)(E) ARE ONLY TO BE USED IF THE MATERIAL FAILS TO MEET THE SPECIFIC LIMITS LISTED IN 2.01 (G)(4)</p> <p>ECDC CONTROLLED COPY NO. 0011</p>				
(10) REQUESTOR: COMPANY: FDF		DATE: 1/18/98	(12) FCE / PE	DATE: 1/18/98
(13) RESPONSE: FOR RCI, IS A DCN REQUIRED? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES		(14) FOR DCN: <input type="checkbox"/> APPROVED <input checked="" type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED		
<p>In (9) above, add:</p> <p>② at the end of the sentence, add "in Section 02770, para. 2.01 B."</p> <p>③ in the 4th line of para. 2.01 G. 5., change the "or" to "and" so that the sentence reads "... at the same time <u>and</u> in the same lot as the failing roll."</p>				
RCI - DCN ACCEPTANCE				
(15) DESIGN ORGANIZATION APPROVAL: [Signature]		DATE: 19 Feb 98	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:	
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)			DATE: 2/20/98	
PERFORMANCE GRADE: (17) 4				
(18) CONSTRUCTION CONCURRENCE: N/A		DATE:	(21) WORK COMPLETED: (SIGNATURE BY FCE OR PE) DATE:	
PURCHASE REQUESTION REQUIRED: <input type="checkbox"/> YES <input type="checkbox"/> NO (19)				

4260 (10/01/96)

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ORIGINAL



TOTAL P. 02

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) WP / WO NO.: 20102		(2) S/C NO.: 614		(5) Pg OF	(6) DATE 4/16/98
(3) S/C TITLE: SWU EXCAVATION / O.S.D.F. PH-II				(11) RCI NO.: N/A	
(4) RESPONSIBLE DISCIPLINE: E <input checked="" type="checkbox"/> M <input type="checkbox"/> C <input type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN TITLE: DELETE T-96 FIRE + EVAC. O.S.D.F. SUPPORT FACILITIES		(11) DCN NO.: 20102 - 007	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.		(7) REV.	(8) OTHER
80X-5500-E-00048 REV-0 BLDG 80 REMOVED 0		DELETE DWGS. II			
923-24067-01 THRU 923-24067-13 ATTACHED					
<p>(9) <input type="checkbox"/> RCI - INQUIRY <input type="checkbox"/> USQD SCREENING BY PROJECT ENGINEER (9) <input checked="" type="checkbox"/> DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE</p> <p>DISCONNECT FIRE ALARM + EVAC SYSTEM FROM T-96. CLOUD AREA OF DWG. 80X-5500-E-00048 WHICH IDENTIFIES T-96 CONNECTION TO FIRE ALARM SYSTEM AND NOTE AS IN ACTIVE.</p> <p>ALSO CANCEL ALL DWGS 923-24067-01 THRU 923-24067-13 SHOWING MONEYWELL CONNECTIONS AT PLANT #8.</p> <p>ORIGINAL INSTALLATION COMPLETED AS W/O 1600 S/C 543.</p>					
(10) REQUESTOR: LOU WEHLITZ		COMPANY: F.D.F.		DATE: 4/16/98	(12) CE / PE: [Signature] 4/17/98
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES			(14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED		
<p>ECDC CONTROLLED</p> <p>COPY NO. C011</p>					
RCI - DCN ACCEPTANCE					
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: [Signature]			DATE: 4/27/98		
<input type="checkbox"/> FIT <input type="checkbox"/> FORM <input type="checkbox"/> FUNCTION			(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2CC21		
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)					
[Signature] 4/27/98					
PERFORMANCE GRADE: (17)					
(18) CONSTRUCTION CONCURRENCE: [Signature]			DATE: 4/27/98		
PURCHASE REQUISITION REQUIRED: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO (19)			(21) WORK COMPLETED: (SIGNOFF BY CE OR PE)		

ORIGINAL 000037

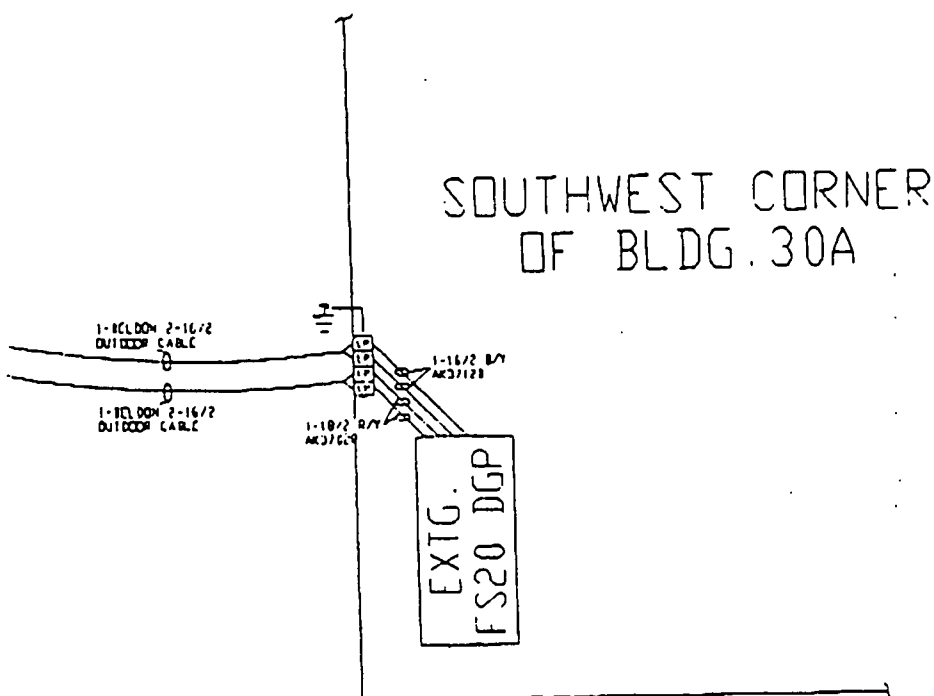
-02 RCUF#1 LAYOUT / RISER DIAGRAM
 -03 RCUF#1 CONNECTION DETAILS - #1
 -04 RCUF#1 CONNECTION DETAILS - #2
 -05 RCUF#2 LAYOUT / RISER DIAGRAM
 -06 RCUF#2 CONNECTION DETAILS - #1
 -07 RCUF#2 CONNECTION DETAILS - #2
 -08 RCUF#3 LAYOUT / RISER DIAGRAM
 -09 RCUF#3 CONNECTION DETAILS - #1
 -10 RCUF#3 CONNECTION DETAILS - #2
 -11 RCUF#4 LAYOUT / RISER DIAGRAM
 -12 RCUF#4 CONNECTION DETAILS - #1
 -13 RCUF#4 CONNECTION DETAILS - #2

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Co./Dept.		Co.	
Phone #		Phone #	<i>3508</i>
Fax # <i>4528</i>		Fax #	

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A			
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SUPERSEDES		DRAWN BY: MAT	DATE: 10/7/94
SUPERSEDED BY		APPROVED BY	DRAWING NUMBER: 923-24067-01
		SHEET 1 OF 13	

000038

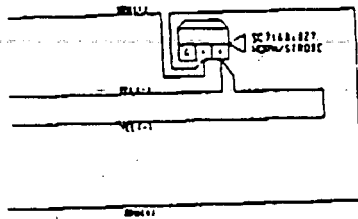


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Patent 5,489,569 Copyright 1989			
C			RCUF #1 LAYOUT/RISER DIAGRAM
B			
A			
REVISIONS		DATE	APP'D
SUPERSEDES		DRAWN BY: MAY	DATE 10/7/94
SUPERSEDES BY		APPROVED BY:	SHEET 2 OF 13
DRAWING NUMBER 923-24067-02			REV

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RADIATION CONTROL UNIT FACILITY #1



EXISTING FS20 DGP
MODULES AND WIRING
LOCATED IN SOUTH-
WEST CORNER OF
BLDG. 30A

PANEL #1	PANEL #2	PANEL #3
OPEN POS 1	POS 8 POS 7 POS 6 POS 5 POS 4 POS 3	POS 14 POS 13 POS 12 POS 11 BATTERIES BATTERIES

BLDG. 30
FIRE ALARM
PANELS

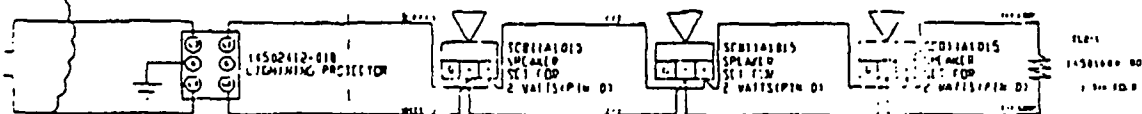
HONEYWELL

ControlCADD®
Patent #4087494 Copyr. Int. 1989

C		FERMCO FSC 543 - RAD CONTROL UNITS (RCU)	
B		7400 VILLEY RD.	
A		FERNALD, OHIO 45061	
REVISIONS		DATE	APPD.
SUPERSEDES		DATE 10/7/94	DRAWING NUMBER 923-24067-03
SUPERSEDED BY		APPROVED BY	SHEET 3 OF 13

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RADIATION CONTROL UNIT FACILITY #1



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Patent #4003694 Copyright, 1989

C				RCUF#1 CONNECTION DETAILS DIAGRAM #2
B				FERMCO FSC 543 - RAD CONTROL UNITS (RCUF#1)
A				7400 VILLEY RD. FERNALD, OHIO 45061
REVISIONS		DATE	APP'D	
SUPPLEDES	DRAWN BY: MAY	DATE 10/7/94		DRAWING NUMBER 923-24067-04
SUPPLEMENTED BY	APPROVED BY:	SHEET 4 OF 13		

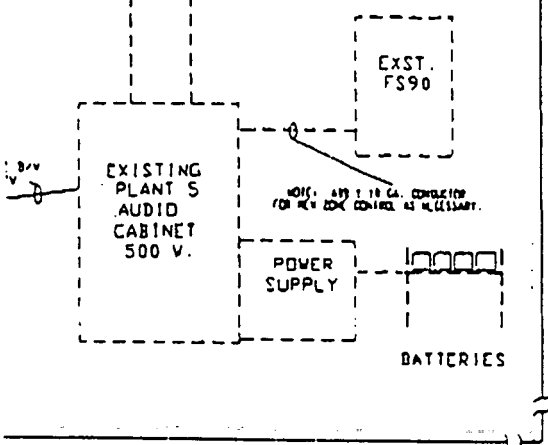
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ATION
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SEALER
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RISE ELEC. SUBSTATION



ELEC. SUBSTATION

W2 1/1
7123

FS90 DGP

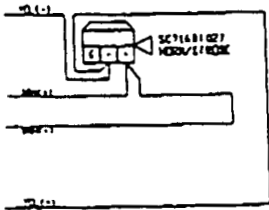
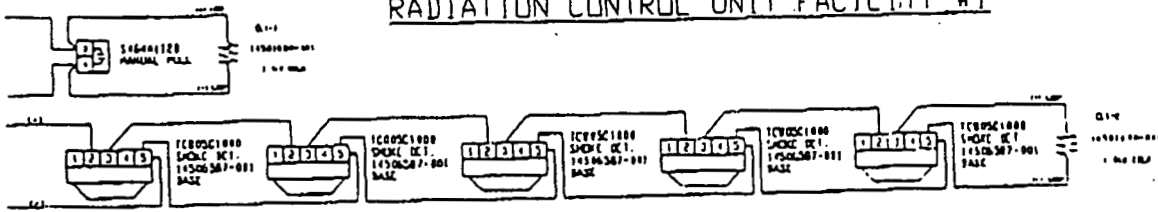
HONEYWELL

ControlCADD®
Patent 5,488,594 Copyright, 1989

C				RCUF12 LAYOUT/RISE DIAGRAM
B				FERMCO FSC 543 - RAD CONTROL UNITS (RCUF)
A				7400 VILLEY RD. FERNALD, OHIO 45061
REVISIONS	DATE	APPD		
SUPERSEDES	DRAWN BY: MAY	DATE 10/7/94	DRAWING NUMBER	923-24067-05
SUPERSEDES BY	APPROVED BY:	SHEET 5 OF 13		

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RADIATION CONTROL UNIT FACILITY #1



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Patent 4,400,564 Copyright, 1984

RCUF#2 CONNECTION DETAILS DIAGRAM #1

FERMCO FSC 543 - RAD CONTROL UNITS (RCUF)
 7400 WILLEY RD.
 FERMCO, OHIO 45061

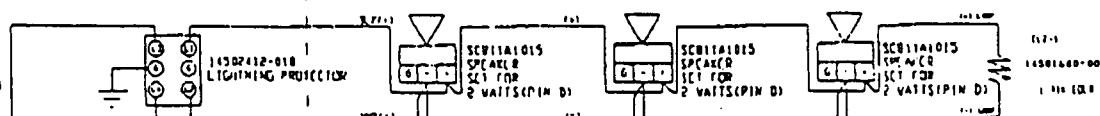
REVISIONS	DATE	APPD
C		
B		
A		
SUPERSEDED	DRAWN BY: MAY	DATE 10/7/94
SUPERSEDED BY	APPROVED BY:	SHEET 6 OF 13

DRAWING NUMBER 923-24067-06

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RADIATION CONTROL UNIT FACILITY #2



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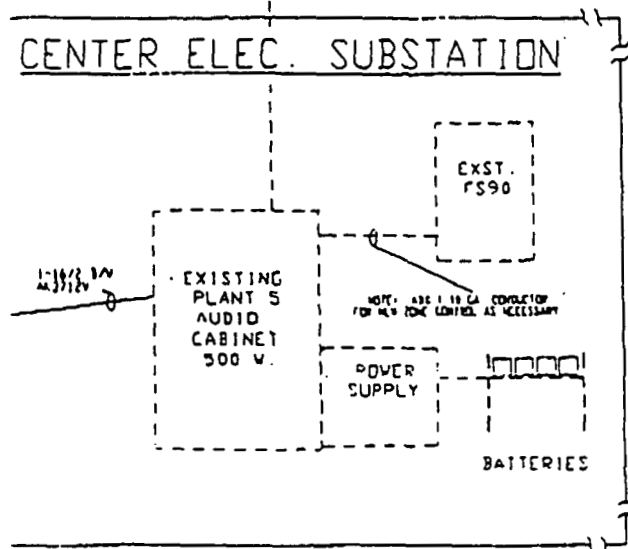
ControlCADD®

Patent #4885654 Copyright, 1989

C				RCUF#2 CONNECTION DETAILS DIAGRAM #2
E				
A				
REVISIONS		DATE	APP'D	
SUPERSEDES	DRAWN BY: MAY	DATE 10/7/94	DRAWING NUMBER	923-24067-07
EXPERIENCED BY	APPROVED BY:	SHEET 7 OF 13		

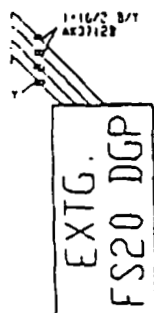
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TO EXTG.
PLANT 2/3
EVACUATION
SPEAKER
ZONES



PLANT 2/3

ELEC. SUBSTATION



HONEYWELL

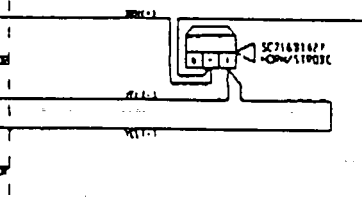
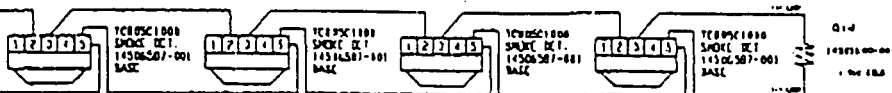
ControlCADD®
Patent #4003694 Copyright. 1989

C				RCUF13 LAYOUT/RISE DIAGRAM
B				FERMCO FSC 543 - RAD CONTROL UNITS (RCUF)
A				7400 VILLEY RD. FERNALD, OHIO 45361
REVISIONS		DATE	APP'D	
SUPERSEDES	DRAWN BY: MAY	DATE 10/7/94	DRAWING NUMBER	923-24067-00
SUPERSEDED BY	APPROVED BY:	SHEET 8 OF 13		

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RADIATION CONTROL UNIT FACILITY #3



EXISTING FS20 DGP
MODULES AND WIRING
LOCATED IN PLANT 2/3
ELECTRIC SUBSTATION

PANEL #1	PANEL #3
POS 6	POS 12
POS 5	POS 11
POS 4	BATTERIES
POS 3	BATTERIES
POS 2	POS 8
POS 1	POS 7
	PANEL #2

PLANT 2/3
ELEC. SUBSTATION
FIRE ALARM PANELS

HONEYWELL

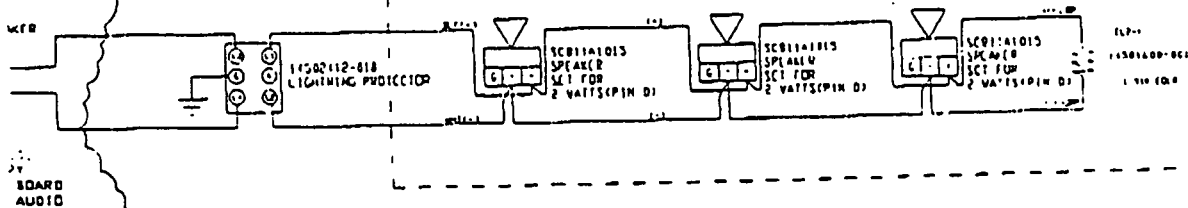
CONTRICADD®
Patent 4,400,564 Copyright 1989

C				PCU#3 CONNECTION DETAILS DIAGRAM #1
B				
A				
REVISIONS	DATE	APP		FERMCO FSC 543 - RAD CONTROL UNITS (GROUP 1) 7400 VILLEY RD. FERNALD, OHIO 45661
SUPERSEDES	DRAWN BY: MAY	DATE 10/1/94	DRAWING NUMBER	923-24067-09
SUPERSEDES BY	APPROVED BY:	SHEET 9 OF 13		

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2. ALL DASHED ITEMS ARE EXISTING.

RADIATION CONTROL UNIT FACILITY #3



HONEYWELL

ControlCADD®

Patent #4887644 Copyright, 1987

C				RCUF#3 CONNECTION DETAILS DIAGRAM #2
B				FERMCO FSC 543 - RAD CONTROL UNITS (RCUF)
A				7400 VILLEY RD.
				PERNOLD, OHIO 45061
REVISIONS	DATE	BY		
SUPERSEDES	Drawn by: HAY	DATE 10/7/94	DRAWING NUMBER	923-24067-10
SUPERSEDED BY	APPROVED BY:	SHEET 10 of 13		

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APR-17-98 FRI 11:38

FERMCO

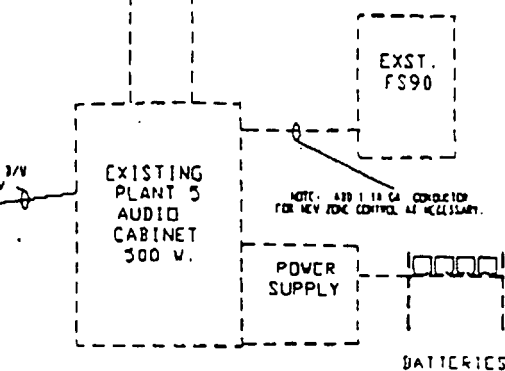
FAX NO. 6483055

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FLR. ELEC. CONTROL RM.

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FSC DGP

HONEYWELL

ControlCAD®

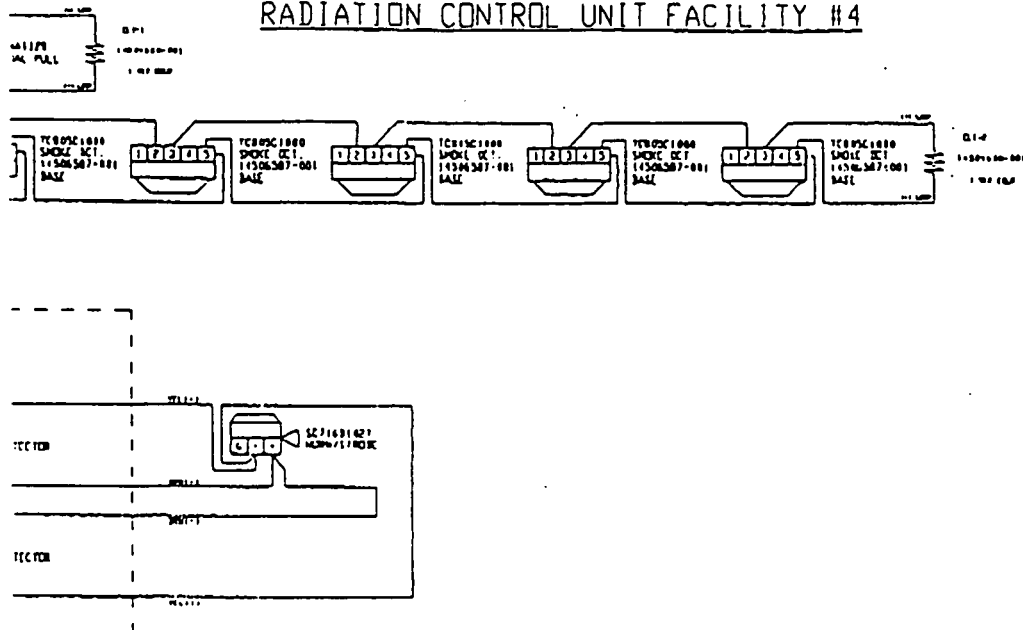
Patent #4885694 Copyright, 1989

C				RCUF84 LAYOUT/RISER DIAGRAM
B				FERMCO FSC 543 - RAD CONTROL UNITS (RCUF)
A				7400 VALLEY RD.
REVISIONS		DATE	APP	FERNALD, OHIO 45061
SUPERVISOR	DRAWN BY: MAY	DATE 10/7/94	DRAWING	923-24067-11
APPROVED BY	APPROVED BY	SHEET 11 OF 13	WORK	

000048

LIGHTING
STOR PANEL

RADIATION CONTROL UNIT FACILITY #4



EXISTING FS20 DGP
MODULES AND WIRING
LOCATED IN PLANT 8
2ND FLR ELECTRICAL
CONTROL ROOM

PANEL #2

POS 8
POS 7
POS 6
POS 5
POS 4
POS 3
LIGHTING
PROTEC

PANEL #4

POS 16
POS 15
BATTERIES
BATTERIES
POS 12
POS 11
POS 10
OPEN

PLANT 8
FIRE ALARM
PANELS

HONEYWELL

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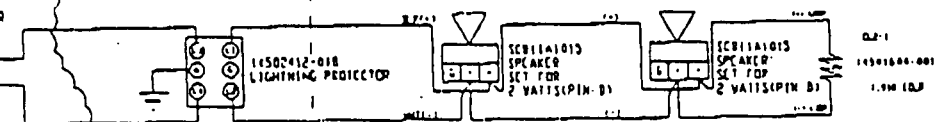
PATENT #4003694 COPYR. 1989

RCUF#4 CONNECTION DETAILS DIAGRAM #1			
FERMCO FSC 543 - RAD CONTROL UNITS (RCUF)			
7460 VILLEY RD			
FERNALD, OHIO 45061			
REVISED	DATE	APP	REV
1. REVISED BY	10/7/94	10/7/94	923-24067-12
APPROVED BY	12/12/94	12/12/94	

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RADIATION CONTROL UNIT FACILITY #4



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ControlCAUD0

Patent #4885694 Copyr: Ont. 1989

C				RCUF#4 CONNECTION DETAILS DIAGRAM #2
B				FERMCO FSC 543 - RAD CONTROL UNITS (RCUF#4)
A				7400 VILLEY RD.
				PERNOLD, OHIO 45061
REVISIONS	DATE	APPD		
SUPERSEDES	DRAWN BY: MAY	DATE 10/7/94	DRAWING NUMBER	923-24067-13
SUPERSEDED BY	APPROVED BY:	SHEET 13 OF 13		

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RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1)WP / WO NO.: 20102		(2)S/C NO.: FSC-614		(5)Pg 1 OF 1	(6)DATE 22April 1998
(3)S/C TITLE: OSDF PHASE II					(11)RCI NO.:
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER		(4A)RCI/DCN TITLE: GCL Laboratory QCTesting			(11)DCN NO.: 20102-008
(7)DOCUMENTS AFFECTED		(7)DOCUMENT NOS.	(7)REV	(8)OTHER	
Spec. 02772 Table 02772-1			0		
Spec. 02772P Table 02772P-1			1		
Construction Quality Assurance Plan PL-006		Table 8-1	0		
(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER			(9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE		
<p>The documents affected contain inconsistencies with respect to the hydraulic conductivity testing and reporting requirements and need to be changed. Add the following note to the affected tables. Identify the note as note no. 8 on Table 02772-1, note no. 7 on Table 02772P-1 and note no. 3 on Table 8-1. Include the note number as a superscript number next to the property or test name Hydraulic Conductivity. For PL-006 change the test method from GRI-GCL 2 to ASTM D 5887. The specific values remain unchanged. Note to be added.</p> <p>"Section 10 of ASTM D5887 provides the equations to calculate the index flux. Hydraulic conductivity shall also be calculated using the average of three thickness measurements on the clay component of the</p>			<p>GCL. The thickness measurements shall be taken at the completion of the test within 30 minutes after dismantling the test specimen. Calipers or similar devices shall be used for measuring after carefully cutting the test specimen with a sharp razor knife and folding back the lower geotextile backing. The hydraulic conductivity shall be calculated in accordance with the applicable method presented Section 9 of the referenced ASTM D5084, noting that the length of the specimen is the average of the three thickness measurements made. Report the average thickness measurement (cm) and the hydraulic conductivity (cm/sec) along with the items required in Section 11 of ASTM D5887."</p>		
(10)REQUESTOR: <i>David Bodnar</i>		COMPANY: <i>GeoSyntec</i>		DATE: <i>22 April 98</i>	
(12)CE / PE		DATE: <i>4/23/98</i>			
(13)RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES (14) FOR DCN: <i>APPROVED</i> APPROVED AS NOTED DISAPPROVED					
<p>ECDC CONTROLLED</p> <p>COPY NO <i>11</i></p>					
RCI - DCN ACCEPTANCE					
(15)DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: <i>22 April 98</i>			(20)CHARGE NO. FOR CADD SERVICES TO INCORPORATE:		
<i>David Bodnar</i> <input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION					
(16)FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE. (DCN ONLY)			DATE: <i>4/27/98</i>		
(17) PERFORMANCE GRADE: <i>4</i>			<i>Rich Heath by G. C. Johnson</i>		
(18)CONSTRUCTION CONCURRENCE: <i>[Signature]</i>			DATE: <i>4/27/98</i>		
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			(21)WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE: <i>[Signature]</i>		

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RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1)WP / WO NO.: 20102		(2)S/C NO.: FSC-614		(5)Pg 1 OF 1	(6)DATE 22April 98
(3)S/C TITLE: OSDF Phase II					(11)RCI NO.:
(4) RESPONSIBLE DISCIPLINE: E M C <input checked="" type="checkbox"/> OTHER		(4A)RCI/DCN TITLE: GCL Peel Strength Testing Unit			(11)DCN NO.: 20102-009
(7)DOCUMENTS AFFECTED		(7)DOCUMENT NOS.	(7)REV	(8)OTHER	
Spec. Section 02772 Table 02772-1			0		
Spec. Section 02772P Table 02772P-1			1		
(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER			(9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE		
<p>The affected tables indicated the unit for Peel Strength (GCL) as lbs/in. This is incorrect and needs to be changed to lbs.</p>					
(10)REQUESTOR: <i>Paul Brink</i>		COMPANY: GeoSyntec	DATE: 22 April 98	(12)CE / PE <i>[Signature]</i> DATE: 4/23/98	
(13)RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED					
<p>ECDC CONTROLLED COPY NO. 011</p>					
RCI - DCN ACCEPTANCE					
(15)DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: <i>Paul Brink</i> 22 April 98			(20)CHARGE NO. FOR CADD SERVICES TO INCORPORATE:		
<input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION					
(16)FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)					DATE: 4/27/98
(17) PERFORMANCE GRADE: 4 Rich Henth by J. C. Johnson					
(18)CONSTRUCTION CONCURRENCE: <i>[Signature]</i> DATE: 4/27/98			(21)WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:		
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1)WP / WO NO.: 20102		(2)S/C NO.FSC-614		(5)Pg 1 OF 1	(6)DATE 5May1998
(3)S/C TITLE: Phase II Construction				(11)RCI NO.:	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A)RCI/DCN TITLE: Air Pressure Testing		(11)DCN NO.:20102-010	
(7)DOCUMENTS AFFECTED		(7)DOCUMENT NOS.		(7)REV	(8)OTHER
20102-TS-0001 Section 02605 Part 3.05.C		20102-02605		0	
(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER			(9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE		
<p>Specification Section 02605 requires the carrier pipe to be hydrostatically pressure tested at 50 psi for SDR 26 pipe (LCS project) and 120 psi for SDR 11 pipe (Phase I and II projects). The specification also allows the use of air pressure testing in lieu of hydrostatic testing when approved in writing by the Construction Manager. Taking into account safety considerations and the connections of portions of the pipe to the Liner Penetration Boxes the following specification change is recommended.</p>			<p>Add the following sentence to Section 02605 Part 3.05.C for Project 20102. "If air pressure testing is approved and is used to final test installed HDPE solid wall carrier pipe between the Cell and LCS/LDS Manholes a minimum test pressure of 15 psig shall be used." Note that test durations remain unchanged.</p>		
(10)REQUESTOR: COMPANY: DATE:		(12)CE / PE DATE:			
<i>David Bodino</i> <i>GeoSyn Tec</i> <i>5 May 98</i>		<i>[Signature]</i> <i>05/6/98</i> <i>5/6/98</i>			
(13)RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED					
<p>ECDC CONTROLLED</p> <p>COPY NO. C011</p>					
RCI - DCN ACCEPTANCE					
(15)DESIGN ORGANIZATION APPROVAL/DISAPPROVAL:DATE:			(20)CHARGE NO. FOR CADD SERVICES TO INCORPORATE:		
<i>David Bodino</i> <i>5 May 98</i> <input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION			<i>N/A</i>		
(16)PDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:					
(17) PERFORMANCE GRADE: <i>4</i> <i>5/6/98</i>					
(18)CONSTRUCTION CONCURRENCE: DATE: <i>05/6/98</i>			(21)WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:		
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					

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RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

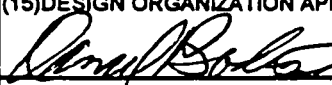
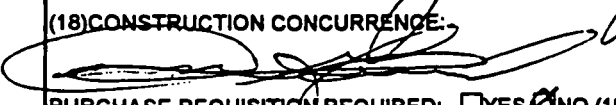
(1)WP / WO NO.: 20102		(2)S/C NO.: FSC-614		(5)Pg 1 OF 1	(6)DATE 06May 98
(3)S/C TITLE: OSDF Phase II				(11)RCI NO.: 20102-002R	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A)RCI/DCN TITLE: Significant Digit for Geotextile Filter AOS		(11)DCN NO.: 20102-011	
(7)DOCUMENTS AFFECTED		(7)DOCUMENT NOS.	(7)REV	(8)OTHER	
20102-TS-0001 Section 02714		Table 02714-1	0		
20102-TS-0001-Section 02714P		Table 02714P-1	1		
(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER			(9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE		
<p>Tables 02714P-1 and 02714-1 of the referenced technical specifications indicate a specified value for apparent opening size of 0.21 mm maximum. The intent of the required value was to correspond to the retained size of the No. 70 U.S.A. Standard Sieve. The specified value should be changed from 0.21mm maximum to 0.212 mm maximum. Manufacturers typically report their values according to the standard sieve sizes.</p> <p style="text-align: right;">E CDC CONTROLLED COPY NO. 011</p>					
(10)REQUESTOR: <i>Ramuel Bodino</i>		COMPANY: GeoSyntec	DATE: 6 May 98	(12)CE / PE <i>[Signature]</i>	DATE: 05/06/98
(13)RESPONSE: FOR RCI, IS A DCN REQ'D?		(14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED			
RCI - DCN ACCEPTANCE					
(15)DESIGN ORGANIZATION APPROVAL/DISAPPROVAL:DATE: <i>Ramuel Bodino</i>			(20)CHARGE NO. FOR CADD SERVICES TO INCORPORATE: NA		
(16)FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)			DATE: 5/6/98		
(17) PERFORMANCE GRADE: 7					
(18)CONSTRUCTION CONCURRENCE: <i>[Signature]</i>		DATE: 05/06/98	(21)WORK COMPLETED: (SIGNOFF BY CE OR PE)		DATE:
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					

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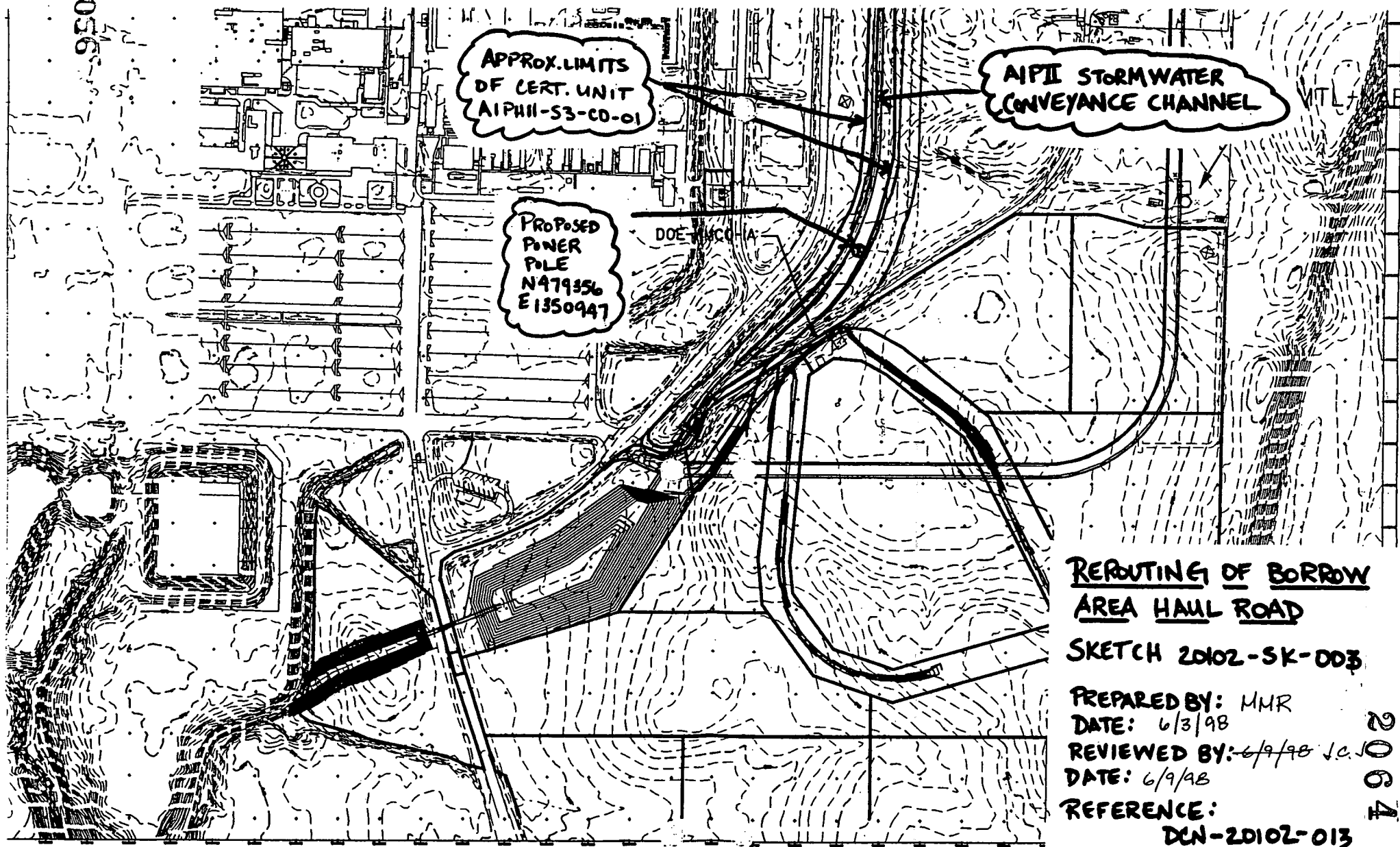
RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102		(2) S/C NO.: FSC-614		(5) Pg 1 OF 2	(6) DATE: 6/3/98
(3) S/C TITLE: OSDF PHASE II				(11) RCI NO.:	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN TITLE: REROUTING OF BORROW AREA HAUL ROAD		(11) DCN NO.: 20102-013	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV.	(8) OTHER	
90X-6000-G-00202 SHEET G-2B			0 11/6/97		
90X-6000-G-00203 SHEET G-2C			0 11/6/97		
90X-6000-G-00221 SHEET G-2D			0 11/6/97		
(9) <input type="checkbox"/> RCI - INQUIRY <input type="checkbox"/> USQD SCREENING BY PROJECT ENGINEER			(9) <input checked="" type="checkbox"/> DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE		
<p>REROUTE OSDF BORROW AREA HAUL ROAD AS SHOWN ON SKETCH 20102-SK-003. THE NEW LOCATION TO THE SOUTH MAY USE THE EXISTING DITCH CROSSING AND STP ACCESS ROAD AND BE ROUTED AROUND THE LOCATION FOR A PROPOSED POWER POLE (N479356, E1350947).</p> <p>THE NEW LOCATION AT THE NORTHERN END OF HAUL ROAD WILL MAKE USE OF EXISTING GATE AND ROAD CROSSING OF THE NEW NORTH ENTRANCE ROAD TO REDUCE THE LENGTH OF THE HAUL ROAD, WHICH WILL MINIMIZE ROAD CONSTRUCTION. THE NEW LOCATION OF THE HAUL ROAD SHOULD BE ROUTED TO AVOID DISTURBANCE OF STOCKPILE MTL-OSD-008 IF PRACTICAL.</p>			<p>THE NEW LOCATION OF THE HAUL ROAD SHOULD BE ROUTED SO AS NOT TO DISTURB THE PROPOSED A1P11 STORMWATER CONVEYANCE CHANNEL LAYOUT LOCATED IN CERTIFICATION UNIT A1P11-S3-CD-01.</p> <p>ECDC CONTROLLED COPY NO 1 1</p>		
(10) REQUESTOR: MAUREEN RICHARD		COMPANY: FDR	DATE: 6/3/98	(12) CE / PE DON GOETZ 06/09/98 DATE 6/9/98	
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES		(14) FOR DCN: <input type="checkbox"/> APPROVED <input checked="" type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED			
Security Fence north of the existing break area may need to be relocated					
GEOSYNTEC		RCI - DCN ACCEPTANCE			
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL:		DATE: 10 June 98	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2CCD8		
 <input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION					
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)					
PERFORMANCE GRADE: (17) 5 James C. Jenkins 6/15/98					
(18) CONSTRUCTION CONCURRENCE:		DATE: 06/15/98	(21) WORK COMPLETED: (SIGNOFF BY CE OR PE)		DATE:
					
PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO (19)					

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REROUTING OF BORROW
AREA HAUL ROAD

SKETCH 20102-SK-003

PREPARED BY: MMR

DATE: 6/3/98

REVIEWED BY: 6/9/98 J.C.J.

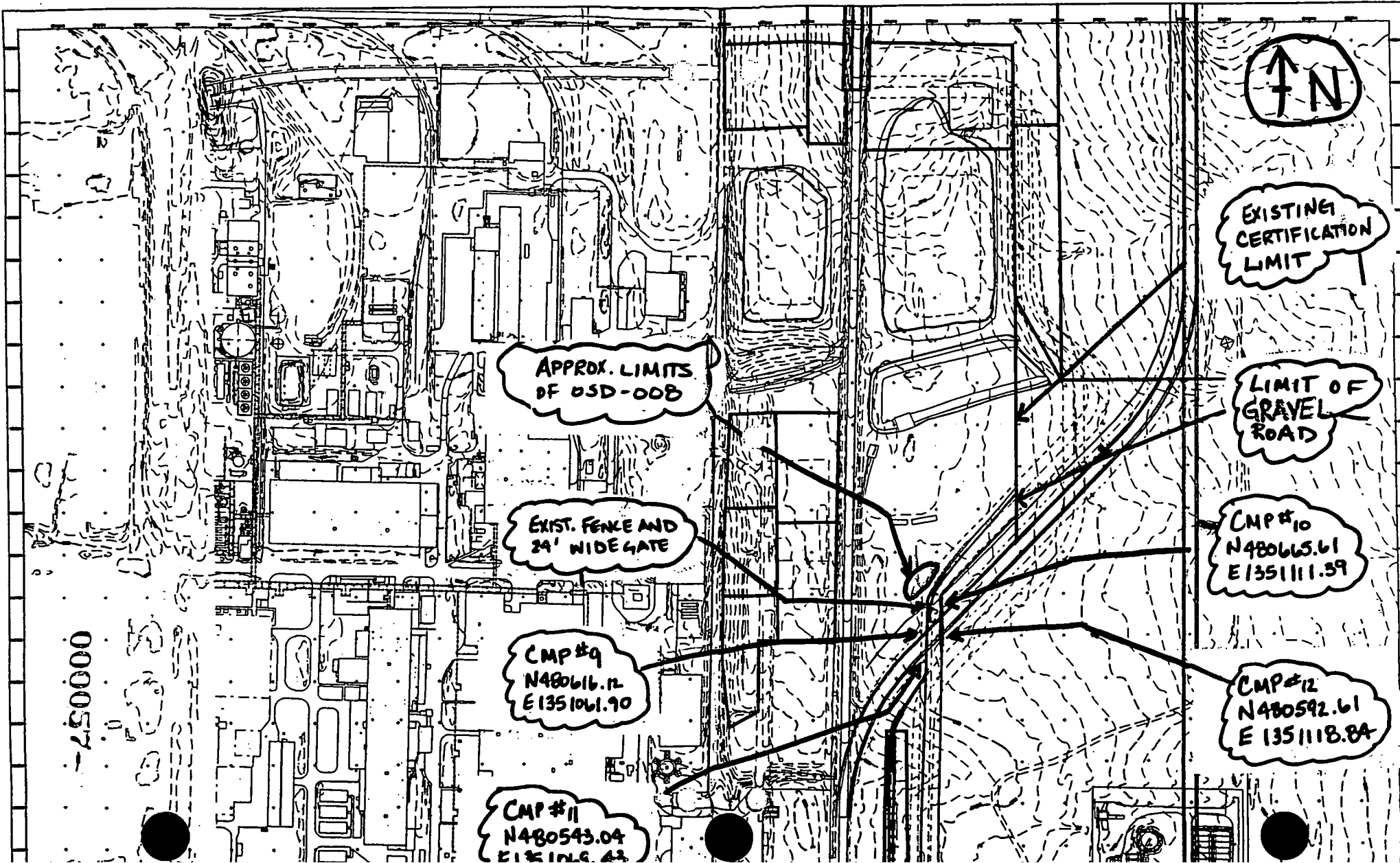
DATE: 6/9/98

REFERENCE:

DLN-20102-013

SCALE 1"=200'

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EXISTING
CERTIFICATION
LIMIT

LIMIT OF
GRAVEL
ROAD

CMP #10
N480665.61
E1351111.59

CMP #12
N480592.61
E1351118.84

APPROX. LIMITS
OF OSD-008

EXIST. FENCE AND
24' WIDE GATE

CMP #9
N480616.12
E1351061.90

CMP #11
N480543.04
E1351066.43

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REQUEST FOR CLARIFICATION OF INFORMATION/ DESIGN CHANGE NOTICE -

159792 RCL 5/26/98

(1) WP / WO NO.: 20102		(2) S/C NO.: ESC 614		(5) Pg OF 1 2		(3) DATE 5/19/98	
(3) S/C TITLE: OSDF PHASE II, SUPPLY OF GEOSYNTHETIC MATERIALS						(11) RCI NO.:	
(4) RESPONSIBLE DISCIPLINE: ED MD CR OTHERD		(4A) RCI/DCN TITLE: REVISION TO GCL PROPERTIES AND TESTING REQUIREMENTS				(11) DCN NO.: 20102-014	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.		(7) REV.		(8) OTHER	
TECHNICAL SPECIFICATION GEOSYNTHETIC CLAY LINER		SECTION 02772P					
<p>(9) <input type="checkbox"/> RCI - INQUIRY <input type="checkbox"/> USED SCREENING BY PROJECT ENGINEER (9A) DCN JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE</p> <p>TO INCORPORATE STANDARDIZED TESTING PROCEDURES AS RECOMMENDED IN ASTM D 5889, INCORPORATE THE FOLLOWING CHANGES TO SPECIFICATION SECTION 02772P</p> <p>SEE ATTACHED SHEETS</p> <p>ECDC CONTROLLED</p> <p>COPY NO 011</p>							
(10) REQUESTOR: REHCO		COMPANY: FDF 5/19/98		DATE: (12) FCE / PE UPAN KUMTHAKAR		5/	
(13) RESPONSE: FOR RCI IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES				(14) FOR DCN: <input type="checkbox"/> APPROVED <input checked="" type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVE			
<p>Note that Item 3 should refer to page 02772P-3 and that Item 7 should state milliliters instead of millimeters.</p> <p>GeoSynTec Consultants Kenneth W. Cargill, P.E.</p>							
RCI - DCN ACCEPTANCE							
(15) DESIGN ORGANIZATION APPROVAL: 19 May 98				(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:			
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)							
PERFORMANCE GRADE (17) 4 J. C. J. Kumar							
(18) CONSTRUCTION CONCURRENCE: NA				DATE: (21) WORK COMPLETED: (SIGNOFF BY FCE OR PE)			
PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input type="checkbox"/> NO (19)							

FST-268 (10/01/98)

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SUPPLY OF GEOSYNTHETIC MATERIALS
DCN NO. 20102-014
ITEM NO. 9
May 19, 1998

TECHNICAL SPECIFICATIONS		
ITEM NO.	REFER TO:	ACTION
1.	Page 02772P-2	Revise Article 1.04.B to read as follows: B. For each proposed geosynthetic clay liner material lot, submit to FDF at least 14 calender days prior to transporting geosynthetic clay liner to the site the results of manufacturing quality control tests and internal and interface shear strength tests. Geosynthetic clay liner for the internal and interface shear strength shall be tested using procedures and conditions specified in Article 2.01.G.1 and 2 of this Section.
2.	Page 02772P-3	Revise Article 1.04.C.3 by adding the word "manufacturing" between "results of" and "quality".
3.	Page 02772P-3	Revise Article 1.04.C by adding the following: 4. Results of internal and interface shear strength tests, including description of test methods, procedure, and conditions.
4.	SECTION 02772P Page 02772P-3	Delete Article 2.01 E.4.
5.	SECTION 02772P Page 02772P-4	Delete Article 2.01 F.4.
6.	SECTION 02772P Page 02772P-7	Add the following test and procedure to Article 2.02B Bentonite Fluid Loss: ASTM D5891
7.	Page 02772P-9 Table 02772P-1	Add the following to the GCL Properties: Properties - Bentonite Fluid Loss Qualifiers - Maximum Units - Milliliters Specified Values - 18 Test Method - ASTM D5891

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102		(2) S/C NO.: FSC-614		(5) Pg 1 OF 1	(6) DATE 03 June 98
(3) S/C TITLE: OSDF Phase II				(11) RCI NO.:	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN TITLE: Conditioning for Geomembrane Conformance Test Samples		(11) DCN NO.: 20102-017	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV	(8) OTHER	
Construction Quality Assurance Plan (PL-006)		Table 7.1	0		
Construction Quality Assurance Plan (PL-006)		Table 7-2	0		
Technical Specification Section 02770		Table 02770-2	0		
(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER Conditioning of Geomembrane Conformance Test Samples is being clarified and made consistent with the project Technical Specification Section 02770. Add to the CQA Plan Table 7.1 the following notes: 2. Where conditioning of test samples is required, conditioning shall be minimum 1 hr at standard laboratory atmosphere. 3. Test procedure for ASTM D638 shall be modified by NSF 54 Annex A.			(9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE Add to the CQA Plan Table 7.2 and project Technical Specification Table 02770-2 the following note: 4. Conditioning of test samples shall be minimum 1 hr at standard laboratory atmosphere.		
(10) REQUESTOR: <i>Ran Budino</i> COMPANY: GeoSyntec DATE: 3 June 1998			(12) CE / PE <i>DAN GOETZ</i> DATE: <i>6/9/98</i> <i>JAMES C. JENKINS</i> <i>6/9/98</i>		
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED					
RCI - DCN ACCEPTANCE					
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: <i>3 June 98</i> <i>Ran Budino</i> <input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION			(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:		
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: <i>6/9/98</i>					
(17) PERFORMANCE GRADE: <i>5 James C. Jenkins</i>					
(18) CONSTRUCTION CONCURRENCE: DATE: <i>6/9/98</i>			(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:		
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					

ECDC CONTROLLED

COPY NO.

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ORIGINAL

**GEOSYNTEC CONSULTANTS**

30 April 1998

Jim Turner, Quality Assurance Engineer
MS:64 Fluor Daniel Fernald
7400 Willey Road
Fernald, Ohio 45030

Subject : Corrective Action Completed for Finding FY98-0370.

Dear Jim Turner :

The proposed corrective actions for Finding FY98-0370 was completed by Mr. Bryan Tindell. Please find enclosed Mr. Tindell's "Corrective Action Response for Finding FY98-0370 (ASTM D638 Testing Deviations)".

In regard to preventing recurrence, I am editing appropriate SOP/s in our SOP Manual, and expect to complete the edits tonight or tomorrow. Please find attached a copy of an SOP showing how the edit in regard to conditioning will look.

Sincerely,

Daniel S. Carlson

CC: David Phillips
Daniel Schauer
Bryan Tindell

ENC: Mr. Tindell's "Corrective Action Response for Finding FY98-0370 (ASTM D638 Testing Deviations)"
Copy of SOP D413-82(1993), intended Revision 3.

L:\LETTERS\JTURNER\JTURNER6.DOC

4/30/98

Corporate Office:
621 N.W. 53rd Street • Suite 650
Boca Raton, Florida 33487 • USA
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Columbia, MD • Huntington Beach, CA
Walnut Creek, CA • Brussels, Belgium

Laboratories:
Atlanta, GA
Boca Raton, FL
Huntington Beach, CA



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**CORRECTIVE ACTION RESPONSE FOR FINDING FY98-0370
(ASTM D638 Testing Deviations)**

INTRODUCTION

On 26th February 1998, a nonconformance report was issued by Mr. James T. Turner of Fluor Daniel Fernald after their audit of GeoSyntec MTL. The nonconformance report specified a deviation from the ASTM D638 "Standard Test Method for Tensile Properties of Plastics" as follows:

ASTM D638-91, SECTION 7, (CONDITIONING), STATES CONDITION THE TEST SPECIMENS AT 73.4 PLUS OR MINUS 3.6 DEGREES FAHRENHEIT AND 50 PLUS OR MINUS 5 PERCENT RELATIVE HUMIDITY FOR NOT LESS THAN 40 HOURS PRIOR TO TESTING.

THE GEOMEMBRANE SAMPLES ARE CONDITIONED [AT GEOSYNTEC MTL] FOR 3 TO 4 HOURS.

GeoSyntec MTL SOP/s have not, until now, specifically addressed this 40 hr conditioning requirement. The standard practice within the MTL is that samples will be conditioned in standard laboratory temperature for at least 3 hours before testing, or overnight for at least 24 hours if the samples are received warm.

RESPONSE

- GeoSyntec MTL staff are highly aware of temperature effects on geomembrane properties, specifically tensile properties.
- The GeoSyntec MTL is located in South Florida where samples arriving at the lab below standard laboratory temperatures is highly unusual. However, samples arriving at temperatures above standard laboratory temperatures is a possibility, particularly during the summer months. Therefore, no samples are prepared for testing until they are "cool" (i.e., geomembrane has had time to adjust to the standard laboratory temperature and feels cool to the touch).
- Typically, samples are received in the morning via an overnight delivery service. This normally results in receiving "cool" samples. The samples are

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then held in the staging area of the lab at standard laboratory atmosphere until they can be logged in and prepared. This process typically takes a minimum of 3 hours, even when expedited turn-around time is required (i.e., the client has indicated an urgent need for test results). For non-rush testing, samples might be held for one to three days at standard laboratory atmosphere prior to testing.

- If a sample is received at the GeoSyntec MTL that is warm to the touch (i.e., noticeably above standard laboratory temperature), then the sample is held in the staging area overnight or for a minimum of 24 hours. Providing that the sample is "cool" to the touch after the 24 hour hold, then it is processed through the login and preparation process. This process requires a minimum of 3 hours as mentioned above.
- The practices described above are being incorporated into appropriate SOP/s in GeoSyntec MTL's SOP Manual using the following wording:

"Geosynthetic samples will not be tested until they are at standard laboratory temperature; i.e., samples will be conditioned in standard laboratory temperature for at least 3 hours before testing. This is considered an acceptable deviation from the specified 40 hour conditioning time."

JUSTIFICATION FOR GEOSYNTEC MTL PRACTICE

ASTM D638-96, "Standard Test Method for Tensile Properties of Plastics" states in Section 1.2:

"This test method can be used for testing materials of any thickness up to 14 mm (0.55 in.)."

and in Section 9.1:

"9.1 *Conditioning*—Condition the test specimens at $23 \pm 2^\circ\text{C}$ ($73.4 \pm 3.6^\circ\text{F}$) and $50 \pm 5\%$ relative humidity for not less than 40 h prior to test in accordance with Procedure A of Practice D 618, for those tests where conditioning is required. In cases of disagreement, the tolerances shall be $\pm 1^\circ\text{C}$ (1.8°F) and $\pm 2\%$ relative humidity."

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Referring to ASTM D618-95, "Standard Practice for Conditioning Plastics and Electrical Insulating Materials for Testing", background is provided for conditioning the samples. The scope of ASTM D618 states:

"1. Scope

1.1 In general, the physical and electrical properties of plastics and electrical insulating materials are influenced by temperature and relative humidity in a manner that materially affects test results. In order that reliable comparisons may be made of different materials and between different laboratories, it is necessary to standardize the humidity conditions, as well as the temperature, to which specimens of these materials are subjected prior to and during testing. This practice defines procedures for conditioning plastics and electrical insulating materials (although not necessarily to equilibrium) prior to testing, and the conditions under which they shall be tested."

Section 3.1.2 of ASTM D618 provides the following definition for standard laboratory atmosphere:

"3.1.2 *standard laboratory atmosphere*—an atmosphere having a temperature of 23°C (73.4°F) and a relative humidity of 50% with standard tolerances as specified in 3.2 shall be the standard laboratory atmosphere."

Significance and use for method ASTM D618 is stated in Section 4 as follows:

"4. Significance and Use

4.1 Conditioning of specimens may be undertaken: (1) for the purpose of bringing the material into equilibrium with normal or average room conditions, (2) simply to obtain reproducible results, regardless of previous history of exposure, or (3) to subject the material to abnormal conditions of temperature or humidity in order to predict its service behavior.

4.2 The conditioning procedures prescribed in this practice are designed to obtain reproducible results and may give physical values somewhat higher or somewhat lower than values under equilibrium at normal conditions, depending upon the particular material and test. To ensure substantial

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equilibrium under normal conditions of humidity and temperature, however, may require from 20 to 100 days or more depending upon thickness and type of material and its previous history. Consequently, conditioning for reproducibility must of necessity be used for general purchase specifications and product control tests."

ASTM D618 Procedure A is quoted below for ease of reference:

"8. Standard Procedures for Conditioning Prior to Test

8.1 *Procedure A*—Condition 40/23/50 for specimens 7 mm (0.25 in.) or under in thickness, 88/23/50 for specimens over 7 mm—Condition test specimens 7 mm or under in thickness in the standard laboratory atmosphere for a minimum of 40 h immediately prior to testing. Treat test specimens over 7 mm in thickness as above, except that the minimum time shall be 88 h. Provide adequate air circulation on all sides of the test specimens by placing them in suitable racks, hanging them from metal clips or laying them on wide-mesh, wire screen frames with at least 25 mm (1 in.) between the screen and the surface of the bench."

Upon reviewing the conditioning requirements set forth in ASTM D638 and ASTM D618 several considerations can be made. These are discussed below.

Thickness Consideration

The time required for a material to reach substantial temperature equilibrium is dependent on thickness (i.e. thicker materials require a longer time). ASTM D638 is applicable to, and, therefore, must account for appropriate conditioning time, for samples up to a thickness of 14 mm (0.55 in.). ASTM D618 procedure requires a conditioning time of 40 hours at a standard laboratory atmosphere for materials up to 7 mm (0.28 in.). The GeoSyntec MTL typically performs ASTM D638 on geomembranes with thicknesses between 40 mil (i.e. 1.0 mm (0.04 in.)) to 80 mil (i.e. 2 mm (0.08 in.)). Therefore, GeoSyntec MTL performs tests on samples that are approximately only 28% of the maximum thickness for samples requiring a conditioning time of 40 hours.

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Sample Condition Consideration

The intent for conditioning specimens relates to obtaining reproducible results, regardless of previous history of exposure. Therefore, samples must be in a reproducible condition of standard laboratory atmosphere that will help provide for reproducible results.

NSF Standard 54 Modifications to ASTM D638 for Geomembrane

The National Sanitation Foundation (NSF) publicized a standard (Standard 54) specific to flexible membrane liners. This publication set precedents that have since become accepted standard industry practice. A part of NSF Standard 54, Annex A, "Special Test Methods and Revised Standard Test Method", was developed and publicized to establish test methods and procedures to supplement ASTM methods specific to flexible membrane liners. Part 8 of NSF Standard 54, Annex A, "Tensile Strength for HDPE/VLDPE, Non-Textured Sheet", addresses modifications to ASTM D638 that are appropriate for geomembrane. The first modification applies to conditioning the specimen and is provided below for ease of reference.

"The specimens shall be conditioned at $21 \pm .5^{\circ}\text{C}$ ($70 \pm 1^{\circ}\text{F}$) and $55 \pm 10\%$ relative humidity for not less than 1 hr. prior to testing."

Conclusion

Based upon review and understanding of ASTM D638, ASTM D618 and of NSF Standard 54 which reflects accepted standard industry practice, GeoSyntec MTL considers the deviation from ASTM D638 acceptable.

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RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102		(2) S/C NO.: FSC-614		(5) Pg 1 OF 1	(6) DATE 22 June 98
(3) S/C TITLE: OSDF Phase II					(11) RCI NO.:
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN TITLE: CQA PLAN Test Standards and Procedures		(11) DCN NO.: 20102-027	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.		(7) REV	(8) OTHER
Construction Quality Assurance Plan 20100-PL-006		Sections 6.9.1, 7.1, 8.1, and 9.1		0	
(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER Changes to the Construction Quality Assurance (CQA) Plan are being made to provide clarifications to the appropriate version of the applicable test methods and standards to be used by the laboratories. This will ensure that consistency is maintained.			(9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE Make the following changes to the CQA Plan: Section 6.9.1 (page 6-7, Test Methods), replace "...current ASTM test procedures indicated in Tables 6-3 and 6-4." with "...current version of ASTM test procedures indicated in Tables 6-3 and 6-4 which are in effect at the time of award of construction contract unless otherwise specified or approved by the Construction Manager." Section 7.1 (page 7-1, Introduction), Section 8.1 (page 8-1, Introduction), and Section 9.1 (page 9-1, Introduction), replace "...current versions of the ASTM or other applicable test procedure indicated in Tables x-1 and x-2." With "...current versions of the ASTM or other applicable test procedure indicated in Tables x-1 and x-2 which are in effect at the time of award of construction contract, unless otherwise specified or approved by the Construction Manager." Note that "x" refers to the respective section numbers (i.e., 7, 8, or 9).		
(10) REQUESTOR: <i>Robert Kwas</i> COMPANY: GeoSyntec DATE: 22 June 1998 Kwas, BADU-TWENEBAH		(12) CE / PE: <i>Don G. DETE</i> DATE: 06/24/98 JAMES C. LENKINS <i>J.C. Jenkins</i> 6/24/98			
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED					
RCI - DCN ACCEPTANCE					
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: <i>Daniel Bodine</i> Daniel Bodine <input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION			(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N.A.		
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)					DATE: 6/24/98
(17) PERFORMANCE GRADE: <i>5 James C. Jenkins</i>					
(18) CONSTRUCTION CONCURRENCE: <i>[Signature]</i> DATE: 06/24/98		(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE: 000067			
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1)WP / WO NO.: 20102		(2)S/C NO.: FSC-614		(5)Pg 1 OF 1	(6)DATE 30 June 98
(3)S/C TITLE: OSDF Phase II					(11)RCI NO.:
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A)RCI/DCN TITLE: Use of Straw Bales for Erosion and Sediment Control.		(11)DCN NO.: 20102-029	
(7)DOCUMENTS AFFECTED		(7)DOCUMENT NOS.		(7)REV	(7)REV. (8)OTHER
20102-TS-0001 Section 02270 (Erosion and Sediment Control)		Part 3.01C, page 02270-3		0	
<p>(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER (9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE.</p> <p>Changes to the Technical Specification are being made to be consistent with the Erosion and Sediment control procedures which require that straw bales should not be used as a prefilter in conjunction with check dams.</p> <p>Please note that this does not apply to the use of straw bales as defined in the IMP Plan (20100-PL-007).</p> <p>Delete the last sentence of Part 3.01C (page 02270-3) of Section 02270.</p>					
(10)REQUESTOR: <i>K. Badu-Tweneboah</i> GeoSyntec Kwasi Badu-Tweneboah		DATE: 30 June 1998		(12)CE / PE <i>Don Goetz</i> <i>JAMES C. JENKINS</i> DATE: <i>6/30/98</i>	
(13)RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED					
RCI - DCN ACCEPTANCE					
(15)DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: <i>Daniel Bodine</i> <i>Daniel Bodine</i>			(20)CHARGE NO. FOR CADD SERVICES TO INCORPORATE: <i>N.A.</i>		
<input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION					
(16)FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)					DATE: <i>6/30/98</i>
(17) PERFORMANCE GRADE: <i>5</i>					
(18)CONSTRUCTION CONCURRENCE: <i>6/30/98</i>			(21)WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:		
(19) PURCHASE REQUESTION REQUIRED: <input type="checkbox"/> YES <input type="checkbox"/> NO					

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COPY NO. **011**

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REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

ECDC CONTROLLED
COPY NO. 011
000069

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102		(2) S/C NO.: FSC-614		(5) Pg 1 OF 2	(6) DATE 05/14/98
(3) S/C TITLE: OSDF PHASE II				(11) RCI NO.: 20102-003R	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input type="checkbox"/> OTHER <input checked="" type="checkbox"/>		(4A) RCI/DCN TITLE: PHASE II FORMER NORTH ENTRANCE ROAD REMOVAL		(11) DCN NO.: 20102-031	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV.	(8) OTHER	
20102-TS-001 Section 02200		Part 3.04.5	1		
(9) <input checked="" type="checkbox"/> RCI - INQUIRY <input type="checkbox"/> USQD SCREENING BY PROJECT ENGINEER			(9) <input type="checkbox"/> DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE		
<p>The Phase II Contract states that a length of the former North Entrance Road in the vicinity of Cell 3 shall be removed by the OSDF Contractor. The attached sketch 20102-SK-0001 gives further details of the removal. Phase II road removal extends north to south from approximately N482182 to N481890. Northing N481890 is the southern extent of Certification Units NAR1, NAR3, and NAR5.</p> <p>Proceeding from N482182 to the south, remove soil from NAR1 to a depth of 12-in. minimum below ground surface for a distance of approx. 170-ft. From approx. N482013 to the southern extent of NAR1, approx. 120-ft., remove 9-in. minimum below ground surface.</p> <p>For NAR3, proceeding from N482182 to the south, remove pavement and subsoil to a depth of 36-in. minimum from the top of pavement for a distance of approx. 185-ft. From approx. N481998 to the southern extent of NAR3, approx. 105-ft., remove 42-in. minimum from top of pavement.</p>			<p>For NAR5, proceeding from N482182 to the south, remove soil to a depth of 8-in. minimum from ground surface for a distance of approx. 110-ft. From approx. N482073 to the southern extent of NAR5, approx. 180-ft., remove 12-in. minimum from ground surface.</p> <p>Refer to Sketch 20102-SK-0001 Phase II North Entrance Road Removal for details of east-west extent of removal. As shown, NAR1 is approx. 21-ft. in width, NAR3 is approx. 22-ft. in width, and NAR5 is approx. 20-ft. in width. To assure that the entire certification unit is excavated, the ditch removal should extend 22-ft. from the edge of pavement or at least 2-ft. west of the top of slope on the west side of NAR1 and at least 2-ft. east of the top of slope on the east side of NAR5.</p>		
(10) REQUESTOR: MAUREEN RICHARD		COMPANY: FDF	DATE: 05/14/98	(12) CE / PE DONALD B. GOETZ JAMES C. JENKINS	
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		(14) FOR DCN: <input type="checkbox"/> APPROVED <input checked="" type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED			
<p>Replace last sentence in specification 02200 Part 3.04.5 as follows: Excavate to a depth below pavement and road shoulder as directed by the construction manager and haul and place excavated material in OSDF.</p>					
RCI - DCN ACCEPTANCE					
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: L. KUMTHAN		DATE: 5/15/98	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N.A.		
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)		DATE: 7/1/98			
PERFORMANCE GRADE: (17) S.A. James C. Jenkins					
(18) CONSTRUCTION CONCURRENCE: L. K. Schlicht		DATE: 5/19/98	(21) WORK COMPLETED: (SIGNOFF BY CE OR PE)		DATE:
PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input type="checkbox"/> NO (19)		ECDC CONTROLLED			
COPY NO. C		011			

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102		(2) S/C NO.: FSC-614		(5) Pg 1 OF 1	(6) DATE 1 July 1998
(3) S/C TITLE: OSDF Phase II				(11) RCI NO.:	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN TITLE: Borrow Area Haul Road		(11) DCN NO.: 20102-034	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.		(7) REV	(8) OTHER
20102-TS-0001 Section 13000		Parts 1.04.A.3, 2.01.A, 3.06.A		1	
<p>(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER (9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE</p> <p>Part 1.04.A.3 of Section 13000 requires the Contractor to provide design (including final alignment and cross-section) of haul road(s) from borrow area. The specifications (Sections 13000 and 02230) require the use of both to the OSDF construction area. According to Part 2.01.A of Section 13000, subbase and base course material for construction of the haul road. The plans the road(s) shall be constructed of subbase and base material, and geotextile that FDF have approved state that that the haul road is temporary and only for separator meeting the requirements of Sections 02230 (Road Construction) Petro's use and that the haul road cross sections and material selections are at and 02714 (Geotextiles), respectively. Finally, Part 3.06.A of Section 13000 the discretion of Petro with approval of the Construction Manager. FDF requires a haul road from the borrow area to the certified area north of the believes that many of the quality control requirements for design and Entrance Road to be constructed in accordance with approved design. construction of the road should not be enforced because of the temporary nature of the road. However, it is understood that the Contractor shall maintain</p> <p>The Contractor's Work Area (CWA) Plan (Submittal No. 2110-1 Rev. 1) the road through Phase II construction. Maintenance shall consist of regrading provides alignment and typical cross section of roads within the CWA. The all soft spots and resurfacing with an adequate thickness of road base material proposed cross-section consists of a nominal 6-in. (150-mm) thick meeting the requirements of Section 02230. GeoSyntec will only perform CQC compacted road base material overlying a geotextile separator. The CWA monitoring and testing when specifically requested by FDF. Because of all of Plan, Earthwork Plan (Submittal No. 2200-1, Rev.0) and Borrow Area the above, the following change to Section 13000 is being made.</p> <p>Management and Restoration Plan (Submittal No. 13000-1, Rev. 0) all discuss the Borrow Area Haul Road. The Earthwork and Borrow Area Revise Part 3.06.A to: "... in accordance with design approved by the Management Plans state that "...offsite borrow materials consist of various Construction Manager". Also, revise Part 3.06.D to: "Road construction shall crushed stone products that may be used to bridge over and stabilize soft be in accordance with Section 02230 and as approved in writing by the and wet subgrade areas crossed by the haul road". The remaining sections Construction Manager".</p> <p>of the haul road would be constructed of on-site clayey rockfill material.</p> <p>Section 4.0 of the CWA Plan indicates that all haul roads within the CWA are "...temporary and exist mainly for the benefit of Petro Environmental." All referenced plans have received FDF approval (B status).</p>					
(10) REQUESTOR: <i>FB</i> Kwasi Badu-Tweneboah		COMPANY: GeoSyntec		DATE: 15 July 1998 FBT	
(12) CE / PE <i>Don Goetz</i> JAMES C. JENKINS		DATE: 7/15/98		<i>J.C. Jenkins</i> 7/15/98	
<p>(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED</p> <p style="text-align: right;">ECDC CONTROLLED COPY NO. 011</p>					
RCI - DCN ACCEPTANCE					
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: <i>Daniel Bodine</i> 15 July 98 Daniel Bodine <input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION			(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N.A.		
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)					DATE: 7/15/98
(17) PERFORMANCE GRADE: <i>5 James C. Jenkins</i>					
(18) CONSTRUCTION CONCURRENCE: DATE: 07/15/98			(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:		
(19) PURCHASE REQUESTION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					

Dan

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102	(2) S/C NO.: FSC-614	(5) Pg 1 OF 3	(6) DATE 10 June 98
(3) S/C TITLE: OSDF Phase II			(11) RCI NO.: 20102-007R
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>	(4A) RCI/DCN TITLE: Clarification to Amendments, Drawings and Specifications		(11) DCN NO.: 20102-036
(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV	(8) OTHER
See Attached Pages 2 and 3		0	

(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER

See attached pages 2 and 3 for clarifications to contract amendments, drawings and specifications. Clarifications are identified by item no., drawing or specification reference and action or clarification taken. All referenced drawings and specifications are Revision 0. Revised drawings and specifications will be issued by FDF.

(10) REQUESTOR: <i>Raniel Bodino</i>	COMPANY: GeoSyntec	DATE: 10 June 1998	(12) CE / PE <i>James C. Jenkins</i>	DATE: 06/15/98
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES (14) FOR DCN: <input type="checkbox"/> APPROVED <input checked="" type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED				
<i>Item 8 Note reference corrected.</i>				

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: <i>Raniel Bodino</i> 15 June 1998		(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: NA
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)		DATE: 7/6/98
(17) PERFORMANCE GRADE:		
(18) CONSTRUCTION CONCURRENCE:	DATE: 06/15/98	(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		

ORIGINAL

ECDC CONTROLLED
COPY NO.

C011

000073

069 DCN 20102-036
~~RET 20102-0074~~

2064

10 JUNE 1998
 page 2 of 3

Item #	REFER TO	ACTION
1	DWG 90X-6000-G-00203 SHEET G-2C	Add coordinates "N 483,399.64 E 1,351,300.57" for termination of former North Entrance Road north of Cell 1.
2	DWG 90X-6000-G-00221 SHEET G-2D	Add coordinates "N 483,399.64 E 1,351,300.57" for termination of former North Entrance Road north of Cell 1.
3	DWG 90X-6000-G-00207 SHEET G-10A	<ol style="list-style-type: none"> 1. Change "See Note 5" pointing to Eastern Drainage Channel to "Note 5". 2. Change Note 5 to read: "5. Runoff from the surface of the area to be capped shall be diverted to the impacted runoff catchment area until the 2-foot thick clay cap is constructed." 3. Change slope symbology from the Extent of Final Cover System Temporary Termination extending south from 3.5:1 max to read "3.5 (min):1".
4	DWG 90X-6000-G-00212 G-20B	Detail 7: Add control point symbols to subgrade slope adjacent to Rerouted North Entrance Road.
5	DWG 90X-6000-G-00215 G-22B	1. Change Liner System Component Summary Geosynthetics title from "Geosynthetics (See Note 10)." to "Geosynthetics (Note 10)."
6	DWG 90X-6000-G-00217 G-23B	<ol style="list-style-type: none"> 1. Detail 20: Change "7" (max) (Note 7)" beneath Intercell berm to read "Varies (Note 7)". 2. Detail 20, Detail 21 and Detail 23: Delete labeling of Protective Layers as "Granular Protective Layer" and "Non Impacted Protective Layer" according to hatch pattern. 3. Detail 21: Change "7" (max) (Note 7)" beneath Intercell berm to read "Varies (Note 7)".
7	DWG 90X-6000-G-00218 G-25B	Change text in Note 5 from "...boxes in completed." to "...boxes is completed."
8	DWG 90X-6000-G-00219 G-26A	<ol style="list-style-type: none"> 1. Change Final Cover System Component Summary Geosynthetics title to read: "Geosynthetics (Note 10)." ¹⁰ 10 ¹⁰ 10 2. Add Note 10 to read: "Geosynthetics will be supplied by Fluor Daniel Fernald."
9	DWG 90X-6000-G-00220 G-30B	Detail 33: Add control point symbols to subgrade slope adjacent to Rerouted North Entrance Road and change slope from existing to proposed.
10	Spec. Section 02100	Paragraph 1.05 D.: Change "Manger" to "Manager".
11	Spec. Section 02200	Paragraph 3.05 A. and B.: Change "ground-water" and "ground-water" to "groundwater".

000074

404 705 2000 P.03/03
R03 DCN 20102-036
~~RET 20102-007A~~
10 JUNE 1998
Page 3 of 3

12	Spec. Section 02215	Paragraph 3.02 B.: Delete "...as necessary..." from the first sentence.
13	Spec. Section 02240	Paragraph 3.01 B.: Change "02714" to "02710".
14	Spec. Section 02250	Paragraph 2.01 B.: Delete "(per ASTM C 136)" from the fourth sentence.
15	Spec. Section 02280	Paragraph 1.04 C.: Change the first sentence to read "... arrange a visit acceptable to the Construction Manager to the proposed..." and the second sentence to read "The Construction Manager, or designer, and CQC...". <i>RAG 6/15/98</i>

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102		(2) S/C NO.: FSC-614	(5) Pg 1 OF 1	(6) DATE 6/23/98
C TITLE: SWU Excavation/OSDF (Phase II) Project			(11) RCI NO.: RCI-20102-009R	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN/TITLE: Control Point Discrepancies		(11) DCN NO.: 20102-038
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Construction Drawings		90X-6000-G-00206	0	

(9) ☒ RCI - INQUIRY ☐ USQD SCREENING BY PROJECT ENGINEER(9) ☐ DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

Review of the Control Point Data on the referenced document, Sheet G-9B, OSDF Phase 2 drawings, shows two apparent discrepancies:

- 1) Point #7215 appears to have an incorrectly stated Northing of 489259.62. It appears the proper Northing should be 489559.62
- 2) Point #7314 is listed twice. It appears that the second listing should be #7315.

A full review of the other control points was not completed. The existence of additional discrepancies is not known.

ECDC CONTROLLED

COPY NO. C011

(10) REQUESTER: Steven C. Brandstetter
 COMPANY: Petro Environmental Technologies, Inc.
 DATE: 6/23/98
 (12) FCE / PE: DON GOETZ
 DATE: 7/13/98
 JAMES C. JENKINS

(13) RESPONSE FOR RCI, IS A DCN REQ'D ☒ NO ☒ YES
 (14) FOR DCN: ☒ APPROVED ☐ APPROVED AS NOTED ☐ DISAPPROVED

1. A typo occurred in the Northing coordinate for point #7215. The correct Northing should be 482559.62.
2. The second listing of point #7314 should be #7315.

K. B. Brandstetter
 KWASI BADU-TWENEBAH
 GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL: *13 July 98*
 DATE: *13 July 98*
 (16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEW ARE COMPLETE: (DCN ONLY)
 DATE: *7/13/98*

PERFORMANCE GRADE: (17) *5*
 CONSTRUCTION CONCURRENCE: *DON GOETZ*
 DATE: *7/13/98*
 PURCHASE REQUISITION REQUIRED: ☐ YES ☒ NO (19)
 (21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE: *7/13/98*

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102		(2) S/C NO.: FSC-614		(5) Pg 1 OF ²⁶⁸ 2	(6) DATE 7
S/C TITLE: SWU Excavation/OSDF (Phase II) Project				(11) RCI NO.: RCI-20102-010R	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN/TITLE: East Drainage Channel, Cell 3		(11) DCN NO.: 20102-039	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.		(7) REV.	(8) OTHER
Construction Drawings		90X-6000-G-00204 90X-6000-G-00227		0 0	
(9) <input checked="" type="checkbox"/> RCI - INQUIRY <input type="checkbox"/> USQD SCREENING BY PROJECT ENGINEER			(9) <input type="checkbox"/> DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE		
<p>The East Drainage Channel and Temporary Drainage Channel can not be built as drawn. The slopes of the east channel will undermine the perimeter fence and the temporary drainage channel is routed through the existing unsuitable material/woodchips stockpile. A field determination of an alternate slope and alignment will have to be made by FDF.</p>					
<p>ECDC CONTROLLED COPY NO. 11</p> <p><i>St. Brandt</i></p>					
(10) REQUESTER: Steven C. Brandstetter		COMPANY: Petro Environmental Technologies, Inc.		DATE: 7/8/98	(12) FCE / PE <i>James C. Jenkins</i> JAMES C. JENKINS
(13) RESPONSE FOR RCI, IS A DCN REQ'D <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES		(14) FOR DCN: <input type="checkbox"/> APPROVED <input checked="" type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED			
<p>This DCN is being prepared to re-route the temporary drainage channel as shown on the attached ⁰⁶⁸ <i>Page 2</i> figure. The re-routed channel shall be constructed to the same minimum cross-section and slopes shown on Drawings 90X-6000-G-00204 and 90X-6000-G-00227. The perimeter fence along the eastern limits of the channel shall be protected from undermining. Provide as-built drawings and protection measures for the re-routed temporary drainage channel.</p>					
<i>K. Brandstetter</i> 7/10/98		RCI - DCN ACCEPTANCE			
(15) DESIGN ORGANIZATION APPROVAL: <i>Daniel Bodine</i> Daniel Bodine		DATE: 13 July 98		(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE 2CCDB	
		<input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION			
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEW ARE COMPLETE: (DCN ONLY)					
PERFORMANCE GRADE: (17) <i>5</i>		<i>James C. Jenkins</i>		DATE: 7/13/98	
CONSTRUCTION CONCURRENCE		DATE: 07/13/98		(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE	
PURCHASE REQUISITION REQUIRED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO (19)					

2064

EXISTING REROUTED
NORTH ENTRANCE
ROAD PHASE I

RE-ROUTED
TEMPORARY
DRAINAGE
SWALE

OSOF-2
TL-NAR-007

W600-2428

CONTRACTOR
WORK AREA
EXISTING EQUIPMENT
WASH FACILITY
COOL LABORATORY
ACCESS CONTROL

NOTE 10

DCN No. 20102-039
Page 2 of 2

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REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) WP / WO NO.: 20102		(2) S/C NO.: FSC 614		(5) Pg 1 OF 1	(6) DATE 7/15/98
(3) S/C TITLE: OSDF PHASE II					(11) RCI NO.:
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN TITLE: REPLACE SECTION 02930, VEGETATION		(11) DCN NO.: 20102-40	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV.	(8) OTHER	
TECHNICAL SPECIFICATIONS			0	SECTION 02930	
" "			0	TABLE OF CONT.	
(9) RCI - INQUIRY <input type="checkbox"/> USQD SCREENING BY PROJECT ENGINEER (9) <input checked="" type="checkbox"/> DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE <ul style="list-style-type: none"> REPLACE SECTION 02930 (VEGETATION) WITH ATTACHED SECTION 02900 (SEEDING) - SPEC/175/ALPH/20712 JCG DATED 06/10/98 JCG CHANGE TO CONFORM TO SITEWIDE STANDARD FOR SEEDING AS AGREED WITH OEPA. 					
(10) REQUESTOR: J. C. JENKINS		COMPANY: FDF		DATE: 7/15/98	(12) CE / PE DONALD B. GEDER JAMES C. JENKINS J.C. Jenkins DATE: 7/15/98
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES Replace Section 02930 with attached section 02900 as noted above. Replace attached Table of Contents (page 12 of 12) as noted. (GEOSYNTEC TO RETYPE SPEC. JCG)					
(14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED					
GEOSYNTEC <i>[Signature]</i> RCI - DCN ACCEPTANCE <i>[Signature]</i> KWASI BADU-TWENEBAH					
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: <i>[Signature]</i> Daniel Boland DATE: 24 July 98 <input type="checkbox"/> FIT <input type="checkbox"/> FORM <input type="checkbox"/> FUNCTION			(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N.A.		
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) PERFORMANCE GRADE: (17) <i>5</i> James C. Jenkins DATE: 8/3/98					
(18) CONSTRUCTION CONCURRENCE: <i>[Signature]</i> PURCHASE REQUISITION REQUIRED: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO (19)			(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) ECDC CONTROLLED COPY NO. C011 DATE:		

SECTION 02900
SEEDING

PART 1 GENERAL

1.1 SCOPE

This Section includes but is not limited to:

- A. Soil preparation.
- B. Interim seeding.
- C. Permanent seeding.
- D. Summer seeding.
- E. Application of fertilizer.
- F. Application of mulch and mulch binder.
- G. Application of crusting agent.

1.2 RELATED SECTIONS AND PLANS

- A. Section 02270 - Erosion and Sediment Control.
- B. Part 6 - Statement of Work.
- C. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 REFERENCES

- A. State of Ohio, Department of Natural Resources (ODNR): Rainwater and Land Development, Ohio's Standard for Storm Water Management, Land Development, and Urban Stream Protection - 1996.
- B. Title 40, Code of Federal Regulations (CFR), Part 161, Identification and Listing of Hazardous Waste.
- C. Sitewide Excavation Plan, current revision.
- D. Land Use Authority, Master Plot, Overall Plan, current plan.

1.4 SUBMITTALS

- A. Provide submittals as required in Part 6. Unless specified otherwise, submittals shall be made to the Construction Manager for review and

approval.

- B. Submit the following within thirty (30) calendar days from Notice to Proceed:
 - 1. Proposed seed mixes and application rates for seed, mulch, mulch binder, and fertilizers.
 - 2. Manufacturer's product data and recommended methods of application for seed, mulches, mulch binder, and fertilizer. Product data for fertilizer shall also include chemical analysis including uranium analysis to assure there is no resultant or derived uranium from fertilizer use.
 - 3. Material Safety Data Sheet (MSDS) for fertilizer and mulch binder.
- C. Provide a plan showing seeding type by area (interim or permanent) and a written statement of proposed changes to seed mix and application rate of seed mix and/or associated materials (i.e., fertilizer, mulch, and mulch binder) a minimum of ten (10) calendar days before seeding. Choice of seeding type shall follow the Land Use Authority, Master Plot, Overall Plan and other pertinent project information according to when areas will be redisturbed.
- D. Submit certificate of compliance for the following within fifteen (15) calendar days before the seeding. Do not sow seed until the Construction Manager has reviewed and approved the certificates.
 - 1. Certificate stating seed mixture, guaranteed percentages of purity, weed content, germination of seed, name of seller, the test date for the seed, and the net weight and date of shipment;
 - 2. Manufacturer's certificate stating the available nutrients contained in the proposed fertilizer;
 - 3. Manufacturer's certificate stating the wood cellulose mulch meets the requirements of this Section; and
 - 4. Manufacturer's certificate stating the mulch binder meets the requirements of this Section.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver containerized materials in uniform packages bearing the name of the manufacturer, the net weight and a statement of content. Deliver containerized materials to the site in original, properly labeled, unopened, clean containers each showing the manufacturer's guaranteed analysis conforming to applicable regulations and standards.
- B. Store materials in a dry area in a manner to prevent physical damage from the elements.

1.6 HEALTH AND SAFETY REQUIREMENTS

- A. Environmental Health and Safety, and Training requirements shall be as

specified in Part 8.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Furnish seed labeled in accordance with the U.S. Department of Agriculture (USDA) Rules and Regulations under the Federal Seed Act and applicable State seed laws. Furnish seed in sealed bags or containers bearing the date of expiration. Do not use seed after its expiration date. Each variety of seed shall: have a purity of not less than 90 percent, have a percentage of germination not less than 80 percent, have a weed to seed content of not more than 0.75 percent and contain no noxious weeds. The above percentages are by weight.

- B. For interim seeding, the seed mixture shall be:

- | | |
|--------------------|--|
| 1. Annual Rye - | 60 pounds pure live seed
(pls)/acre |
| 2. Perennial Rye - | 60 pounds pls/acre |

- C. For permanent seeding, the seed mixture shall be (all measures are pounds pls/acre):

	April 15 - <u>May 31</u>	October 1 - <u>February 28</u>
1. Canada Wild Rye	2	3
2. Little Bluestem	2	3
3. Big Bluestem	3	4
4. Indian Grass	2	3
5. Switch Grass	1/2	1
6. Side Oats Gramma	1/2	1
7. Live Oats	20	25

- D. For summer (June - September) seeding, the seeding mixture shall be:

1. Buckwheat 60 pounds pls/acre.

- F. Obtain water from the on-site sources shown on the Construction Drawings or specified in Part 6, unless otherwise approved by the Construction Manager.

- G. Fertilizer:

1. Use fertilizer that is dry or liquid commercial grade fertilizer, uniform in composition that meets the requirements of all State and Federal

regulations and standards of the Association of Agricultural Chemists.

- 2.Fertilizer for interim seeding shall be VCOTE 34-4-14 as manufactured by George W. Hill or equal.
- 3.Fertilizer for permanent seeding shall be 0-12-12.

H.Furnish mulch meeting the following requirements:

- 1.Mulch shall be straw or wood cellulose fiber, free of clay, stone, foreign substances, and reasonably free of weeds.
- 2.Furnish straw that does not contain sticks larger than 1/4-inch diameter or other materials that may prevent matting down during application. Use straw that is free from mold and other objectionable material and in an air-dry condition suitable for placing with mulch blower equipment or other equipment as approved by the Construction Manager. Straw shall be generally 6 inches or more in length.
- 3.Mulch applied by hydrospraying shall be a wood cellulose processed into a uniform fibrous physical state. Use wood cellulose fiber containing a green dye that will provide for easy visual inspection for uniformity of slurry spread. The wood cellulose fiber including dye, shall contain no growth or germination inhibiting properties. The wood cellulose fiber shall be manufactured in such a manner that, after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogeneous material. When sprayed on the ground, the material shall allow absorption and percolation of moisture. The wood cellulose fiber shall meet the following requirements:

<u>Item</u>	<u>Specification Limit</u>
Particle Length	0.375 inch (maximum)
Particle Thickness	0.047 inch (maximum)
pH	4.0 to 8.5
Ash Content	1.6 percent (maximum)
Water Holding Capacity (based on fiber dry weight)	500 percent (minimum)

I.Mulch binder agent shall be as approved by the Construction Manager and shall meet the following requirements:

- 1.The mulch binder shall be a pine sap emulsion comprised of a 100% organic emulsion produced from naturally occurring resins (pine sap) and be nontoxic to plants. The mulch binder shall not be comprised of chloride, lingsulfonate, petroleum, or asphaltic type emulsions. The mulch binder shall be compatible with application via a hydro seeder, and must not require intense cleaning of equipment after application. Once cured, the mulch binder shall be non-tracking (i.e., will not stick to boots or tires).

2. The mulch binder shall not have hazardous characteristics of ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR Part 261, Subpart C, for a hazardous waste in either its pre-applied or cured states.
3. The mulch binder shall have a flash point greater than 200°F. The mulch binder shall be neither a flammable nor combustible liquid per DOT definition. The mulch binder must not be susceptible to significant deterioration from exposure to the elements, including sunlight.
4. The pine sap emulsion shall be provided in concentrated solution and prepared so that it will not change in transportation or storage.

J. Erosion Control Blanket and Crusting Agent shall be in accordance with Section 02270.

2.2 EQUIPMENT

- A. Provide equipment of size and type to perform work specified in this Section.

PART 3 EXECUTION

3.1 GENERAL

- A. Stabilization of disturbed areas by seeding or by use of a crusting agent shall be performed at completion of excavation or within seven (7) calendar days of knowing a disturbed area will be idle for more than forty-five (45) calendar days, whichever is sooner.
- B. Interim seeding is required for disturbed areas and soil piles which are scheduled to or may be further disturbed within two (2) years, but do not have significant potential of spreading contamination.
- C. Permanent seeding is required for disturbed areas and soil piles which will not be disturbed for more than two (2) years.
- D. Disturbed areas and soil piles which are scheduled to be significantly disturbed within two (2) years, are destined for the On-Site Disposal Facility, and/or need effective erosion control immediately, are to be stabilized with use of a crusting agent as specified in Section 02270.
- E. Stabilization of permanent slopes exceeding 2H:1V shall utilize an erosion control blanket as specified in Section 02270 after application of seed mixture.
- F. Area(s) to be seeded shall be generally free of debris, rock, root material, and other objects which may impede soil preparation and seeding activities. Perform soil preparation by tilling/cultivating, to a depth of approximately

1 of 90

2 inches, to eliminate uneven areas and low spots. Maintain lines, levels and contours.

G.Repeat cultivation in areas where equipment used for hauling and spreading has compacted subgrade.

3.2

APPLICATION

A.Seeding seasons are:

- 1.For interim seeding, October 15 through March 15.
- 2.For permanent seeding, April 15 through May 31, and October 1 through February 28, each with a corresponding application rate.
- 3.Seeding that must be done outside of the above seeding seasons shall be completed with the summer seeding mixture specified in this Section. Application of summer seeding shall be followed during the next seeding season by the application of either interim or permanent seeding, as appropriate, in accordance with the general execution requirements specified in this Section.

B.Apply fertilizer, seed, mulch, and mulch binder to disturbed areas and areas excavated and graded in this Contract requiring seeding unless otherwise indicated or directed by the Construction Manager. All seeding seasons and all application rates for seed and related materials are subject to adjustment as directed or approved by the Construction Manager.

C.Application of Fertilizer:

1. Apply fertilizer at a uniform rate of 1 pound per 1000 square feet.
2. Disc fertilizer thoroughly into upper 2 inches.
- 3.Lightly water to aid the distribution of fertilizer.

D.Sequence of application of seeding mixture, mulch and mulch binder.

- 1.Apply seed mixture at the minimum rate as specified in this Section. Seeding shall be done by hydroseeding, broadcasting, or by drilling to a depth of 1/4 inch followed by cultipacking. When hydroseeding, the mixture tank shall be cleaned prior to use to ensure remnant seed is not introduced to the proposed seed mixture.
- 2.Do not seed areas in excess of that which can be mulched within 24 hours.
- 3.Apply mulch within 24 hours of seeding.
- 4.Spread straw mulch in a uniformly thick layer.
- 5.Apply water with a fine spray immediately after each area has been straw mulched. Wet soil at approximately a rate of 120 gallons per 1,000 square feet.
- 6.Apply mulch binder at the rate specified in this Section.

E. Spread straw mulch, either by hand or by blowing method, at the rate of 2 air-dried tons per acre. During June through September, increase straw mulch application rate to 3 air-dried tons per acre. Application of straw mulch by the blowing method is exempt from the dust control requirements specified in Part 6.

F. Apply sprayed wood cellulose fiber at a net dry weight of 2,000 pounds per acre. Mix the wood cellulose fiber with water at a ratio of 50 pounds of wood cellulose fiber per 100 gallons of water.

G. Maintain mulching material in place with a pine sap emulsion binder. Apply mulch binder according to manufacturer's directions. Unless specified otherwise by the manufacturer, dilute concentrated pine sap emulsion to ratio of four (4) parts water to one (1) part concentrate. Apply diluted pine emulsion at a rate of 2,500 gallons per acre.

3.3

MAINTENANCE

A. Maintain the seeded areas in satisfactory condition until acceptance of the seeding by the Construction Manager. Maintenance of the seeded areas includes repairing eroded areas, revegetating when necessary, watering and mowing (if applicable). A satisfactory condition of the vegetated area is defined as follows:

1. An area shall have a predominant stand of the seeded vegetation.
2. Within 3 weeks, germination must occur over 95 percent of the area with no single bare area greater than 3 square feet.
3. Within 3 months, 95 percent of the area must be covered with mature vegetation.

B. Areas that fail to meet these requirements shall be repaired or reseeded as necessary to produce an acceptable stand of vegetation, as specified in this Section. Areas that become bare during June through September shall be reseeded with the summer seeding mix specified in this Section.

C. Maintain areas applied with a crusting agent to ensure proper erosion control. The crusting agent shall be reapplied to eroded and bare areas as necessary.

3.4

WARRANTY

A. Seeded areas shall be subject to a warranty period of not less than 12 months from initial establishment of vegetation over 100 percent of the seeded areas.

B. At the end of the warranty period, the Construction Manager will perform an inspection upon written request by the Contractor. Seeded areas not demonstrating satisfactory condition of vegetation as specified herein, shall be repaired, reseeded and maintained to meet all requirements as specified herein at the Contractor's expense.

3.5

ACCEPTANCE

A. The seeded areas shall be accepted at the end of the warranty period if a satisfactory condition exists as defined in this Section.

B. After all disturbed areas are stabilized and all necessary corrective work has been completed, the Construction Manager will certify in writing the final acceptance of the seeded areas.

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OSDF-PHII SPEC-REV 0

OSDF PHASE II
CERTIFIED FOR CONSTRUCTION
SPECIFICATIONS PACKAGE
ON-SITE DISPOSAL FACILITY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

TABLE OF CONTENTS

DIVISION 2: SITE WORK

Section 02100	-	Surveying
Section 02110	-	Clearing, Grubbing, and Stripping
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Section 02225	-	Compacted Clay Liner and Cap
Section 02230	-	Road Construction
Section 02240	-	Protective and Contouring Layers
Section 02250	-	Vegetative Soil Layer
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Section 02271	-	Riprap
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Section 02770	-	Geomembrane Liner and Cap
Section 02772	-	Geosynthetic Clay Liner and Cap
Section 02920	-	Topsoil
Section 02930	-	Vegetation K9BT

Section 02900 - Seeding

K. Beaudin
David B. Baker 1/24/98

March 9, 1998

Fernald Environmental Management Project
Letter No. C:OOTP:98-0125

Mr. Jack R. Craig, Director
Department of Energy
Fernald Environmental Management Project
P. O. Box 538705
Cincinnati, Ohio 45253-8705


Dear Mr. Craig:

**CONTRACT DE-AC24-92OR21972, SUMMARY OF SEEDING AND STABILIZATION
MEETING**

This letter transmits a summary of, and associated commitments from, a February 5, 1998 meeting between DOE, Ohio EPA and FDF which was held to discuss the seeding and stabilization of disturbed areas of the site. Ohio EPA is interested in using appropriate seed mixes that will support final restoration and provide temporary habitat to compensate for habitat loss during remediation. In response to Ohio EPA's recommendation, DOE has committed to prepare guidelines for stabilizing disturbed areas to be included in the Sitewide Excavation Plan.

These issues will be discussed with Ohio EPA during our March 10, 1998 meeting. If you have any questions, please call Jyh-Dong Chiou at 648-3726.

Sincerely,




John Bradburne
President

JCB:CAS:jkp
Attachments

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Mr. Jack R. Craig
Letter No. C:OOTP:98-0125
Page 2

c: D. Carr, Fluor Daniel Fernald (FDF), MS52-2
J. Chiou, FDF, MS52-5
T. Hagen, FDF, MS65-2
R. Janke, DOE-FEMP, MS45
K. Nickel, DOE-FEMP, MS45
L. Parsons, DOE Contract Specialist, MS45
~~C. Straub, FDF, MS65-2~~ 
M. Strimbu, FDF, MS52-8
W. Woods, FDF, MS65-2
-ECDC File No. 2500-WP-0023, FDF, MS52-7
File Record Storage Copy 104.4.34.5

DRAFT LETTER

To: Jim Saric and Tom Schneider

From: Johnny Reising

SUMMARY OF SEEDING AND STABILIZATION MEETING

This letter provides a summary of the February 5, 1998 meeting between DOE, Ohio EPA, and Fluor Daniel Fernald. This meeting was conducted to discuss the seeding and stabilization of disturbed areas of the site. Two side issues discussed were submittal of natural resource restoration design plans and consideration of areas containing wetland seed banks.

Ohio EPA recommended preparation of seeding guidelines to account for the duration of area disturbance, final ecological restoration and seasonality of application. Ohio EPA's position was that the use of appropriate seed mixes would support final restoration and provide temporary habitat to compensate for habitat loss during remediation. Ohio EPA discussed the use of a crusting agent for area soils destined for the On-Site Disposal Facility (OSDF) within a period of two years and the use of a temporary seed mix for those area soils disturbed within two years but not destined for the OSDF. For those areas in which disturbance is not expected within two years, Ohio EPA recommended the use of native prairie grasses for revegetation and stabilization.

In response to Ohio EPA recommendations for seeding and stabilization of disturbed areas, DOE prepared guidelines for stabilizing disturbed areas (attached) to be included in the Sitewide Excavation Plan (SEP). These guidelines address three categories of disturbed areas and provide the seed mixture, application rate and method of application associated with each category. These guidelines are to be used to derive area-specific seeding specifications and were developed in accordance with the Ohio Agronomy Guide and in consultation with Dr. Donald Geiger, Plant Physiologist, University of Dayton.

The two side issues discussed were submittal of natural resource restoration design packages and consideration of areas containing wetland seed banks. Natural resource restoration design packages will be submitted separately from the Integrated Remedial Design Packages. Generally, a restoration design package for each sequenced excavation area will be developed during remediation of the area. However, excavation Areas 3, 4 and 5, located in the Former Production Area, will receive a consolidated restoration design package to be implemented after remediation of these areas is complete.

Regarding the issue of wetland seed banks, additional text will be added to the SEP to indicate that vegetated wet areas located within the battery limits of excavation will be considered as seed bank sources prior to their excavation. For example, wetlands located within Area 1, Phase II will be considered seed sources for Phase 1 Wetland Mitigation.

If you have any questions or concerns regarding these documents, please contact Rob Janke at (513) 648-3124 or Kathi Nickel at (513) 648-3166.

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cc: D. Carr, FDF/52-2
J. Chiou, FDF/52-5
T. Hagen, FDF/65-2
C. Straub, FDF/65-2
W. Woods, FDF/65-2
ECDC File No. 2500-WP-0028, FDF/52-7

000092

MEMORANDUM

TO: Dave Phillips

FROM: Kwasi Badu-Tweneboah *LCBT*

DATE: 24 July, 1998

SUBJECT: Replacement of Vegetation Specification
Fernald Environmental Management Project
Fernald, Ohio

FDF would like to replace Section 02930 (Vegetation) with a new specs (Section 02900 - Seeding) for the Phase II project. This new specification conforms to the site-wide standard for seeding as agreed between FDF and OEPA. According to information provided by FDF, the new specs was prepared in consultation with Dr. Donald Geiger, Plant Physiologist, University of Dayton. Copies of the documentation on the site-wide agreement and the new specs will be sent to your attention for the Atlanta office via fedex for Monday delivery.

We have reviewed the new specs and find it acceptable; few minor deviations from the one GeoSyntec prepared. We have therefore approved a DCN for it use here. If any further actions are required we will notify the Atlanta office accordingly.

* * * * *

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RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

2064

(1) WP / WO NO.: 20102		(2) S/C NO.: FSC-614		(5) Pg 1 OF 1	(6) DATE 16 July 98
(3) S/C TITLE: OSDF Phase II					(11) RCI NO.:
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN TITLE: Corrections to Drawings		(11) DCN NO.: 20102-042	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV	(7) REV.	(8) OTHER
Construction Drawings		90X-6000-X-00200 90X-6000-G-00232	2 2		
(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER (9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE A change is being made to the FDF drawing number for Sheet No. G-16A, and to update the Title Sheet, No. X-1B, to show that the drawings have been revised to Revision No. 2.					
(10) REQUESTOR: <i>K. Bodine</i> GeoSyntec Kwasi Badu-Tweneboah		COMPANY: DATE: 16 July 1998		(12) CE / PE <i>Don Goetz</i> DATE: 07/23/98 <i>J.C. JENKINS</i> 7/22/98	
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED					
RCI - DCN ACCEPTANCE					
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: <i>Daniel Bodine</i> 16 July 1998 Daniel Bodine <input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION			(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N.A.		
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: <i>James C. Jenkins</i> 7/23/98					
(17) PERFORMANCE GRADE: <i>5</i>			(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:		
(18) CONSTRUCTION CONCURRENCE: <i>[Signature]</i> DATE: 07/23/98					
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					

ORIGINAL

ECDC CONTROLLED

COPY NO.

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RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102		(2) S/C NO.: FSC-614		(5) Pg 1 OF 1	(6) DATE 5 Aug 98
(3) S/C TITLE: OSDF Phase II				(11) RCI NO.:	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN TITLE: Geomembrane Thickness Testing Method		(11) DCN NO.: 20102-044	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV	(7) REV.	(8) OTHER
20102-TS-0001 Section 02770P, Rev. 1		Parts 1.03.A&B, 2.03.B, Table 02770P-1	1		
20102-TS-0001 Section 02770, Rev. 0		Parts 1.03.A&B, Table 02770-1,	0		
Construction Quality Assurance Plan (20100-PL-006)		Table 7-1	0		
(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER			(9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE		
<p>Changes to Section 02770P, Section 02770, and the CQA Plan are being made to replace the GRI test method for HDPE textured geomembrane with the currently adopted ASTM test method.</p> <p>Add the following to Part 1.03.A (page 02770P-1):</p> <p>11. ASTM D 5994 Standard Test Method for Measuring Core Thickness of Textured Geomembrane.</p> <p>Add the following to Part 1.03.A (page 02770-2):</p> <p>12. ASTM D 5994 Standard Test Method for Measuring Core Thickness of Textured Geomembrane.</p>			<p>Delete Part 1.03.B.1, and change Part 1.03.B.2 to Part 1.03.B.1 of Section 02770P (page 02770P-2).</p> <p>Delete Part 1.03.B.1, and change Part 1.03.C to Part 1.03.B of Section 02770 (page 02770-2).</p> <p>Replace test method or procedure for thickness from "GRI-GM8" to "ASTM D 5994" in page 02770P-5, Table 02770P-1 (page 02770P-7), and Table 02770-1 (page 02770-14) of the Technical Specifications.</p> <p>Replace test method for thickness from "ASTM D 519 or GRI-GM8" with "ASTM D 5994" in Table 7-1 (page 7-22) of the CQA Plan (20100-PL-006).</p>		
(10) REQUESTOR: <i>[Signature]</i> Kwasi Badu-Tweneboah		(10) COMPANY: GeoSyntec	DATE: 5 August 1998	(12) CE / PE <i>[Signature]</i> JAMES C. JENKINS <i>[Signature]</i> 8/6/98	
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES (14) FOR DCN: <input type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED					
ECDC CONTROLLED COPY NO. 0011					
RCI - DCN ACCEPTANCE					
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: 5 August 1998 <i>[Signature]</i> Daniel Bodine <input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION			(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N.A.		
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) <i>N.A.</i>					DATE:
(17) PERFORMANCE GRADE:					
(18) CONSTRUCTION CONCURRENCE: <i>[Signature]</i> 08/11/98			(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:		
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					

JSE

Roll Test Data Report

ROLL NO. AK-4296 FF

2064

ROLL DIMENSIONS $\approx \pm 1\%$

ROLL NUMBER: AK-4296 FF
 PROD DATE: 07/13/98
 SHEET AREA: 8474 sq. ft.
 788 sq. meters
 LENGTH: 355 feet
 108 meters
 WIDTH: 23.87 feet
 7.3 meters
 WEIGHT: 3608 pounds
 1637 kilograms

RESIN LOT INFORMATION

LOT NUMBER Z-40477
 RESIN TYPE 600 SERIES

PROPERTY	UNITS	METHOD	RESULT
DENSITY	g/cc	D1505	0.934
MOISTURE	%	D570	< 0.09
BRITTLINESS	°C	D746	< -70
MELT INDEX	g/10 min.	D1238	0.370

PROPERTY	ASTM METHOD	ORDER MINIMUMS		ACTUAL TEST VALUES	
		ENGLISH	METRIC	ENGLISH	METRIC
TENSILE YIELD STRENGTH	D638				
CD -		173 lb/in	31 kg/cm	201 lb/in	36 kg/cm
MD -		173	31	197	35
YIELD ELONGATION	D638				
CD -		13 %		21 %	
MD -		13		20	
TENSILE BREAK STRENGTH	D638				
CD -		324 lb/in	59 kg/cm	412 lb/in	74 kg/cm
MD -		324	59	396	71
TEAR ELONGATION	D638				
CD -		560 %		676 %	
MD -		560		649	
INITIAL TEARING STRENGTH	D1004				
CD -		60 lb	27 kg	75 lb	34 kg
MD -		60	27	77	35
PUNCTURE STRENGTH	FTMS 101C/2065	105 lb	48 kg	129 lb	58 kg
SHRINKAGE	D1204				
CD -	(1 HR @ 100C)	+/- 2.00 %		0.1 %	
MD -	D5596 specified	2.00		0.1	
CARBON BLACK DISPERSION	D3015	A2		A2	
CARBON BLACK CONTENT	D1603	2.00 %		2.32 %	
GEOMEMBRANE DENSITY	D1505		0.940 g/cc		0.943 g/cc
ESCR	D1693-B	1500 hours	Start	7/17/98	
THICKNESS	D1533/D751				
NOMINAL	5196	80 mil	2.03 mm	80 mil	2.03 mm
MINIMUM		76	1.92	76	1.93
AVG. THICKNESS				81	2.05

TEST NOTES: MD=MACHINE DIRECTION CD=CROSS DIRECTION ESCR START DATE IS GIVEN
 -FOR TENSILE ELONGATION TEST GAUGE LENGTH=1.3 ON YIELD, 2.5 ON BREAK
 ALL STRENGTH VALUES BASED ON NOMINAL THICKNESS

CUSTOMER: FLUOR DANIEL FERNALD/FERMCO

DATE SHIPPED

JOB NO. 7920

COMMENTS

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~~HDPE Textured Geomembrane Thickness~~ Test's Method

PHII PROCUREMENT SPEC-REV. B
 Section 02770: Geomembrane Liner

TABLE 02770-1

REQUIRED HDPE TEXTURED GEOMEMBRANE PROPERTIES

Properties	Qualifiers	Units ⁽¹⁾	Specified Values	Test Method
<u>Physical Properties</u>				
Thickness	average	mils	80	GRI-GM8
	minimum	mils	76	GRI-GM8
Specific Gravity	minimum	N/A	0.94	ASTM D 792 Method A or ASTM D 1505
Carbon Black Content	range	%	2-3	ASTM D 1603
Carbon Black Dispersion	N/A	none	Category 1 or 2	ASTM D 5596
Asperity Height	minimum	mils	7	GRI - GM12
<u>Mechanical Properties</u>				
Tensile Properties (each direction)				
1. Force Per Unit Width at Yield	minimum	lb/in	168	ASTM D 638 (Modified by NSF 54 Annex A)
2. Tensile Strength (force per unit width at break)	minimum	lb/in	120	ASTM D 638 (Modified by NSF 54 Annex A)
3. Elongation at Yield	minimum	%	12	ASTM D 638 (Modified by NSF 54 Annex A)
4. Elongation at Break	minimum	%	100	ASTM D 638 (Modified by NSF 54 Annex A)
Tear Resistance	minimum	lb	56	ASTM D 1004 Die C Puncture

DCI
 175/151
 5994

TABLE 02770-1

REQUIRED HDPE TEXTURED GEOMEMBRANE PROPERTIES

Properties	Qualifiers	Units ⁽¹⁾	Specified Values		Test Method
			Liner	Cap	
<u>Physical Properties</u>					
Thickness	average	mils	80	60	GRI-GM8
	minimum	mils	76	58	GRI-GM8
Specific Gravity	minimum	N/A	0.94		ASTM D 792 Method A or ASTM D 1505
Carbon Black Content	range	%	2-3	2-3	ASTM D 1603
Carbon Black Dispersion	N/A	none	Category 1 or 2		ASTM D 5596
<u>Mechanical Properties</u>					
Tensile Properties (each direction)					
1. Force Per Unit Width at Yield	minimum	lb/in	168	126	ASTM D 638 (Modified by NSF 54 Annex A)
2. Tensile Strength (force per unit width at break)	minimum	lb/in	120	90	ASTM D 638 (Modified by NSF 54 Annex A)
3. Elongation at Yield	minimum	%	12	12	ASTM D 638 (Modified by NSF 54 Annex A)
4. Elongation at Break	minimum	%	100	100	ASTM D 638 (Modified by NSF 54 Annex A)
Tear Resistance	minimum	lb	56	42	ASTM D 1004 Die C Puncture

TABLE 7-1:
GEOMEMBRANE CONFORMANCE
TESTING REQUIREMENTS

TEST NAME	TEST METHOD	MINIMUM TESTING FREQUENCY ⁽¹⁾
Specific Gravity	ASTM D792 Method A or ASTM D1505	1 test per 100,000 ft ²
Thickness	ASTM D 519 or GRI-GM8	1 test per 100,000 ft ²
✓ Tensile Strength at Yield	ASTM D638	1 test per 100,000 ft ²
✓ Tensile Strength at Break	ASTM D638	1 test per 100,000 ft ²
✓ Elongation at Yield	ASTM D638	1 test per 100,000 ft ²
✓ Elongation at Break	ASTM D638	1 test per 100,000 ft ²
Carbon Black Content	ASTM D1603	1 test per 100,000 ft ²
Carbon Dispersion	ASTM D5596	1 test per 100,000 ft ²

Notes: 1. Test shall be performed at a frequency of one per lot or at listed frequency, whichever is greater. A lot shall be as defined by ASTM 4354.

2. Test procedures for Test method ASTM D638 shall be modified
by NSF54 Annex A ~~and D792~~
~~D1505~~

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) WP / WO NO.: 20102		(2) S/C NO.: FSC-614		(5) Pg 1 OF 1	(6) DATE 5 Aug 98
(3) S/C TITLE: OSDF Phase II					(11) RCI NO.:
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN TITLE: Required Properties and Ranges HDPE Pipe and Fittings		(11) DCN NO.: 20102-045	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV	(7) REV.	(8) OTHER
20102-TS-0001 Section 02605		Table 02605-1	1		
<p>(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER (9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE</p> <p>Changes to Table-1 of Section 02605 are being made to the qualifiers for Melt Flow Index to be consistent with the requirements of ASTM D 3350.</p> <p>Table 02605-1 (page 02605-1), for melt flow index, replace "minimum" with "maximum".</p>					
(10) REQUESTOR: <i>K. Badu</i> COMPANY: GeoSyntec DATE: 5 August 1998		(12) CE / PE <i>Don G. Jenkins</i> DATE: <i>08/11/98</i> <i>J. C. JENKINS</i> <i>8/8/98</i>			
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED					
RCI - DCN ACCEPTANCE					
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: <i>5 August 1998</i> <i>Daniel Bodine</i> <input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION			(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: <i>N.A.</i>		
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: <i>8/11/98</i>					
(17) PERFORMANCE GRADE: <i>5</i>					
(18) CONSTRUCTION CONCURRENCE: DATE: <i>08/11/98</i>			(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:		
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					

*Dan*ECDC CONTROLLED
COPY NO.

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TABLE 02605-1
REQUIRED PROPERTIES AND RANGES
HDPE PIPE AND FITTINGS

PCN

Properties	Cell Range	Qualifiers	Units	Specified Values	Test Method
Specific Gravity	3	minimum	N/A	0.941	ASTM D 1505
Melt Flow Index	4	maximum minimum	g/10 min	0.15	ASTM D 1238 (Condition 190/2.16)
	or 5	range	g/10 min	0.15 to 4.0	ASTM D 1238 (Condition 190/21.6)
Flexural Modulus	5	minimum	lb/in ²	110,000	ASTM D 790
✓ Tensile Strength	4	minimum	lb/in ²	3,000	ASTM D 638
Environmental Stress Crack	3	minimum	hrs	F ₂₀ > 192	ASTM D 1693
Hydrostatic Design Basis at 73°F	4	minimum	lb/in ²	1,600	ASTM D 2837
UV Stabilizer	C	minimum	% Carbon Black	2	ASTM D 1603

190°C
2.16k
L

[END OF SECTION]

support additional loads. Through proper pipe and backfill selection, Driscopipe 1000 may be buried at depths in excess of 100 feet. At normal burial depths, a backfill of 85% of Standard Proctor density (AASHTO-99) can limit the ring deflection of Driscopipe to 2% of the original diameter.

Since Driscopipe pipe can be butt fused above ground in long lengths, narrow trench widths can be used to save on installation costs. Due to the ease of handling Driscopipe, it may be readily placed in the trench, thus necessitating a minimum amount of open trench. Trench and trench bottom, embedment materials, and bedding and installation practices are specified in ASTM D 2321.



Primary Properties – Cell Classification – ASTM D3350-84 345434C* ✓

Property	Test Method	0	1	2	3	4	5	6
1 - Density, g/cm ³	D1505		0.910-0.925	0.926-0.940	0.941-0.955	>0.955		
2 - Melt index-condition E (gms/10 min)	D1238		>1.0	1.0-0.4	<0.4-0.15	<0.15		
3 - Flexural modulus, MPa (psi)	D790		<138 (<20,000)	138-<276 (<20,000-<40,000)	276-<552 (40,000-<80,000)	552-<758 (80,000-<110,000)	758-<1103 (110,000-160,000)	<1103 (<160,000)
4 - Tensile strength at yield, MPa (psi)	D638		<15 (<2200)	15-<18 (2200-<2600)	18-<21 (2600-<3000)	21-<24 (3000-<3500)	24-<28 (3500-<4000)	<28 (>4000)
5 - Environmental stress crack resistance:	D1693							
a. Test condition			A	B	C			
b. Test duration, h			48	24	192			
c. Failure, max, %			50	50	20			
6 - Hydrostatic design basis, MPa (psi), (23°C)	D2837	NPR ^a	5.52 (800)	6.89 (1000)	8.62 (1250)	11.03 (1600)		
Color and UV Stabilizer	A	B	C	D	E			
	Natural	Colored	Black with 2% minimum carbon black	Natural with UV stabilizer	Colored with UV			

^aNPR = Not Pressure Rated

*NOTE: Refer to Driscopipe 1000 Data Sheet for complete nominal physical properties documentation, features/advantages/benefits, and listings of major industrial and municipal applications.

TABLE 1 Primary Properties—Cell Classification Limits

Property	Test Method	0	1	2	3	4	5	6
1 Density, g/cm ³	D 1505	...	0.910–0.925	0.926–0.940	0.941–0.955	>0.955
2 Melt index	D 1238	...	>1.0	1.0 to 0.4	<0.4 to 0.15	<0.15
3 Flexural modulus, MPa (psi)	D 790	...	<138 (20 000)	138–276 (20 000 to <40 000)	276–552 (40 000 to 80 000)	552–758 (80 000 to 110 000)	758–1103 (110 000 to <160 000)	>1103 (>160 000)
4 Tensile strength at yield, MPa (psi)	D 638	...	<15 (2200)	15–18 (2200– <2600)	18–21 (2600– <3000)	21–24 (3000– <3500)	24–28 (3500– <4000)	>28 (>4000)
5 Environmental stress crack resistance: a. Test condition b. Test duration, h c. Failure, max. %	D 1693	...	A 48 50	B 24 50	C 192 20
6 Hydrostatic design basis, MPa (psi), (23°C)	D 2837	NPR ^c	5.52 (800)	6.89 (1000)	8.62 (1250)	11.03 (1600)

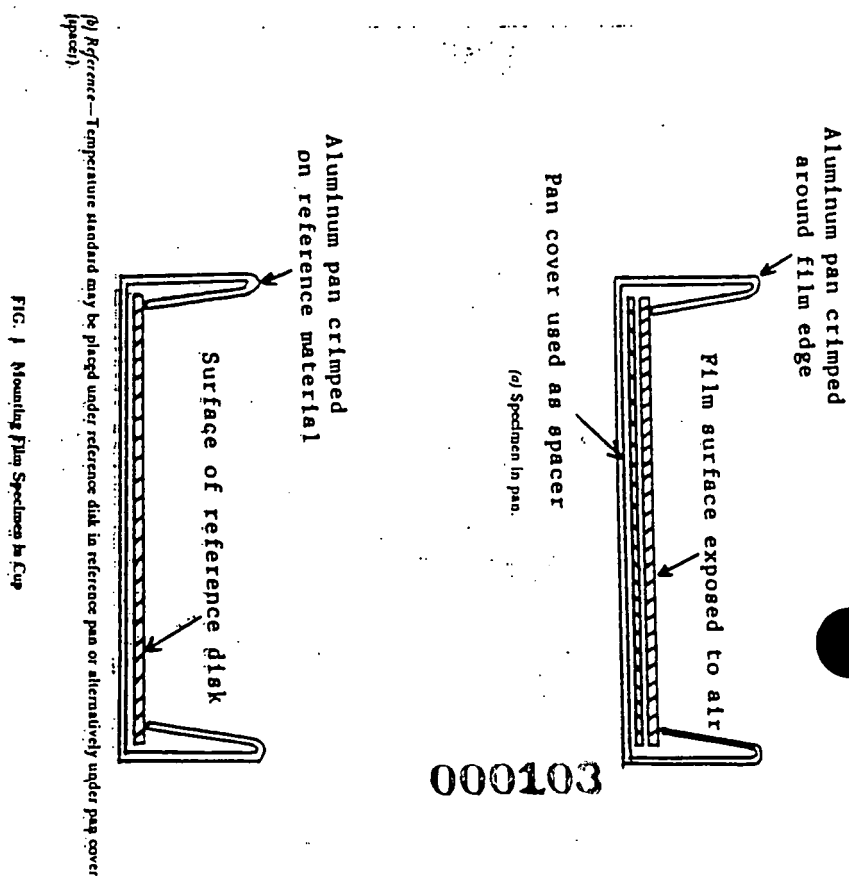
^a Refer to 10.1.4.1^b Refer to 10.1.4.2^c NPR = Not Pressure Rated.

FIG. 1 Mounting Film Specimens in Cup

2064

TABLE 1 Standard Test Conditions, Temperature, and Load

Condition		Temperature, °C	Total Load Including Piston, kg	Approximate Pressure	
Obsolete-For-reference only	Standard Designation			kPa	psi
A	125/0.325	125	0.325	44.8	6.5
B	125/2.16	125	2.16	298.2	43.25
C	150/2.16	150	2.16	298.2	43.25
D	190/0.325	190	0.325	44.8	6.5
E	190/2.16	190	2.16	298.2	43.25
F	190/21.60	190	21.60	2982.2	432.5
G	200/5.0	200	5.0	689.5	100.0
H	230/1.2	230	1.2	165.4	24.0
I	230/3.8	230	3.8	524.0	76.0
J	265/12.5	265	12.5	1723.7	250.0
K	275/0.325	275	0.325	44.8	6.5
L	230/2.16	230	2.16	298.2	43.25
M	190/1.05	190	1.05	144.7	21.0
N	190/10.0	190	10.0	1379.0	200.0
O	300/1.2	300	1.2	165.4	24.0
P	190/5.0	190	5.0	689.5	100.0
Q	235/1.0	235	1.0	138.2	20.05
R	235/2.16	235	2.16	298.2	43.25
S	235/5.0	235	5.0	689.5	100.0
T	250/2.16	250	2.16	298.2	43.25
U	310/12.5	310	12.5	1723.7	250.0
V	210/2.16	210	2.16	298.2	43.25
W	285/2.16	285	2.16	298.2	43.25
X	315/5.0	315	5.0	689.5	100.0

diameter is within the tolerances given in 5.3.

9.4 Remove the piston and place it on an insulated surface. Charge the cylinder within 1 min with a weighed portion of the sample according to the expected flow rate, as given in Table 2. Place the weighted piston in position, and start timing for a 6 to 8-min preheat.

NOTE 12—Experience has shown that for the best reproducibility the piston should operate within the same part of the cylinder for each measurement. The piston is scribed so the starting point for each extrusion is roughly the same. Some excess of material over the minimum required for the actual flow measurement portion of the test is provided by the charging weights shown in Table 2. This is necessary to achieve a void-free extrudate and flow equilibrium before start of rate measurements. For the lower flow rate materials, it may be necessary to manually force some of the excess resin out of the cylinder to obtain proper scribe mark position within the specified preheat time.

NOTE 13—There may be cases where 6 to 8 min of preheat time may not be sufficient. Six minutes is a minimum preheat time. Longer preheat periods are permissible when they can be shown to be necessary. If longer preheat times are used, the report shall so indicate. Care may be necessary to ensure that the sample so tested is adequately protected against changes in polymer structure, usually by appropriate antioxidant addition.

NOTE 14—It is frequently helpful to take interim cuts of the extrudate at uniform time intervals during the specified extrusion time. Weights of these individual cuts give an indication of the presence of bubbles which may be masked due to their size or to opacity of the sample. This technique is particularly helpful in the case of highly pigmented materials. Forcing out some of the resin manually during the preheat period often eliminates bubbles in the test extrudate.

9.5 For flow rates of 0.15 to 10 g/10 min, if the weighted piston alone does not purge sufficient material during the preheat time to obtain piston positioning as required in 9.6, manually purge the estimated excess prior to 4 min. The amount of purge must be regulated so subsequent free travel of the weighted piston will position the scribe marks at the reference start position between the 6th and 8th min (9.6). Manual purging in this manner is permissible only when it is

known that it will not affect results. Otherwise, purge sooner, or use a lower charge weight.

9.6 For flow rates of greater than 10 to 50 g/10 min, the loss of weighed sample as shown in Table 2 could be unduly large by proceeding as in 9.4 without modification. In this case, during the first 6 min of preheat time, either a piston support or a die plug may be used.

9.6.1 A piston support should be of such length that the lower scribe mark of the supported piston will be 25 mm (1 in.) above the top of the cylinder or other reference point (5.4.3). The support may be a piece of wooden dowel rod or the like of appropriate length beneath the weight, to support the weight and thus the piston in the desired position. The

TABLE 2 Standard Test Conditions, Sample Weight,^a and Testing Time—Procedure A^a

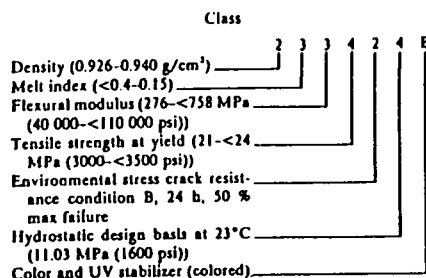
Flow Range, g/10 min	Suggested Weight of Sample in Cylinder, g	Time Interval, min	Factor for Obtaining Flow Rate in g/10 min
0.15 to 1.0	2.5 to 3.0	6.00	1.67
>1.0 to 3.5	3.0 to 5.0	3.00	3.33
>3.5 to 10	5.0 to 8.0	1.00	10.00
>10 to 25	4.0 to 8.0	0.50	20.00
>25 to 50	4.0 to 8.0	0.25	40.00

^a This is a suggested weight for materials with melt densities of about 0.7 g/cm³. Correspondingly, greater quantities are suggested for materials of greater melt densities. Density of the molten resin (without filler) may be obtained using the procedure described by Terry, B. W., and Yang, K., "A New Method for Determining Melt Density as a Function of Pressure and Temperature," *SPE Journal*, SPEJA, Vol 20, No. 6, June 1964, p. 540 or the procedure described by Zoller, Paul, "The Pressure-Volume-Temperature Properties of Polyolefins," *Journal of Applied Polymer Science*, Vol 23, 1979, p. 1051. It may also be obtained from the weight of an extruded known volume of resin at the desired temperature. For example, 25.4 mm (1 in.) of piston movement extrudes 1.804 cm³ of resin. An estimate of the density of the material can be calculated from the following equation:

$$\text{Resin density at test temperature} = W/1.804$$

where W = weight of extruded resin.

^b See 9.11.



3.2 The cell-type format provides the means for identification, close characterization, and specification of material properties, alone or in combination, for a broad range of materials. This type format, however, is subject to possible misapplication since unobtainable property combinations can be selected if the user is not familiar with commercially available materials. The manufacturer should be consulted.

4. Definition

4.1 *polyethylene plastics*—as defined by this specification, plastics or resins prepared by the polymerization of no less than 85 % ethylene and no less than 95 weight % of total olefins with additional compounding ingredients.

5. Materials and Manufacture

5.1 The molding and extrusion material shall be polyethylene plastic in the form of powder, granules, or pellets.

5.2 The molding and extrusion materials shall be as uniform in composition and size and as free of contamination as can be achieved by good manufacturing practice. If necessary, level of contamination may be agreed upon between the manufacturer and the purchaser.

5.3 When specified, the color and translucence of molded or extruded pieces formed, under the conditions recommended by the manufacturer of the materials, shall be comparable within commercial match tolerances to the color and translucence of standard samples supplied in advance by the manufacturer of the material.

6. Physical Requirements

6.1 *Cell Classification*—Test values for specimens of the PE material prepared as specified in Section 9 and tested in accordance with Section 10 shall conform to the requirements given in Table 1. A typical property value for

a PE material is normally the average value from testing numerous lots or batches and determines the cell number (see Appendix X1). If a typical value is near the cell boundary, because of manufacturing tolerances and testing bias, some individual lot or batch values may fall into the adjoining cell. When this occurs, the individual value will be considered acceptable if the user, or both user and producer, determine that the individual lot or batch is suitable for its intended purpose.

6.2 *Color and UV Stabilizer*—The color and UV stabilization shall be indicated at the end of the cell classification by means of a letter designation in accordance with the following code:

Code Letter	Color and UV Stabilizer
A	Natural
B	Colored
C	Black with 2% minimum carbon black
D	Natural with UV stabilizer
E	Colored with UV stabilizer

Note—UV = ultraviolet.

6.3 *Thermal Stability*—The PE material shall contain sufficient antioxidant so that the minimum induction temperature shall be 220°C when tested in accordance with 10.1.9.

6.4 *Brittleness Temperature*—The brittleness temperature shall not be warmer than -60°C when tested in accordance with Test Method D 746.

6.5 *Density*—The density used to classify the material shall be the density of the PE base resin (uncolored PE) determined in accordance with 10.1.3. When the average density of any lot or shipment falls within ± 0.002 g/cm³ of the nominal value, it shall be considered as conforming to the nominal value and to all classifications based on the nominal value.

6.5.1 For black compounds, containing carbon black, determine the density D_p and calculate the resin density D_r as follows:

$$D_r = D_p - 0.0044C$$

where:

C = weight percent of carbon black.

6.5.2 For colored compounds, the nominal density of the base resin shall be provided by the manufacturer, on request.

7. Sampling

7.1 A batch or lot shall be considered as a unit of manufacture and may consist of a blend of two or more production runs of material.

7.2 Unless otherwise agreed between the manufacturer and the purchaser, the material shall be sampled in accordance with the procedure described in Sections 9 through 12 of Recommended Practice D 1898. Adequate statistical sampling prior to packaging shall be considered an acceptable alternative.

8. Testing

8.1 The requirements identified by the material designation and otherwise specified in the purchase order shall be verified by tests made in accordance with the directions given in 11.1. For routine inspection only those tests necessary to identify the material to the satisfaction of the purchaser shall be required. One sample shall be sufficient for testing each batch or lot provided that the average values for all of the tests made on that batch or lot comply with the specified requirements.

9. Specimen Preparation

9.1 Unless otherwise specified in Section 10, the test specimens shall be molded in accordance with Procedure C of Method D 1928.

9.2 When pipe or fitting test specimens are required they shall be extruded or molded in accordance with the recommendations of the material manufacturer.

10. Test Methods

10.1 The properties enumerated in this specification shall be determined in accordance with the following test methods:

10.1.1 *Conditioning*—Unless otherwise specified in the test methods or in this specification, for those tests where conditioning is required, condition the molded test specimens in accordance with Procedure A of Methods D 618.

10.1.2 *Test Conditions*—Unless otherwise specified in the test methods or in this specification, conduct tests at the Standard Laboratory Temperature of $23 \pm 2^\circ\text{C}$ ($73.4 \pm 3.6^\circ\text{F}$).

10.1.3 *Density*—Test Method D 1505 or alternative methods of suitable accuracy as described in A-1 or A-2 of Test Method D 792.

Make duplicate determinations using two separate portions of the same molding or from two moldings. The molded specimen thickness portions shall be 1.9 ± 0.2 mm (0.075 ± 0.008 in.). Calculate the average value.

10.1.4 *Melt Index*—Test Method D 1238, using Condition E. Make duplicate determinations on the material in the form of powder, granules,

or pellets, and calculate the average; no conditioning is required.

10.1.4.1 Classify materials having a melt index less than 0.15 (cell 4) as cell 5 only if they have a flow rate not greater than 4.0 g/10 min when tested in accordance with Test Method D 1238, Condition F.

10.1.4.2 Classify materials having a melt index less than 0.15 (cell 4) as cell 6 only if they have a flow rate not greater than 0.30 g/10 min when tested at 310°C and a total load (including piston) of 12 480 gf.

NOTE 3—Flow rate is the general term used for all results obtained with Test Method D 1238. Although the flow rate of polyethylene plastics may be measured under any of the conditions listed for it under 6.2 of Test Method D 1238, only measurements made at Condition E (190°C, 2160 gf load) may be identified as "Melt Index."

10.1.5 *Flexural Modulus*—Test Methods D 790, using Method 1, Procedure B, and a 50-mm (2-in.) test span. Test five specimens, each 3.2 by 12.7 mm ($\frac{1}{8}$ by $\frac{1}{2}$ in.) flatwise at a crosshead speed of 12.7 mm/min (0.5 in./min) and the average value of the secant modulus calculated at 2 % strain in the outer fibers.

10.1.5.1 The deflection of the test specimen corresponding to 2 % strain (0.02 mm/mm or in./in.) is calculated as follows:

$$D = rL^3/6d$$

where:

D = deflection of the center of the beam test specimen at 2 % strain, in.,

r = strain in the outer fibers = 0.02 mm/mm (0.02 in./in.),

L = test span = 50 mm (2 in.),

d = specimen depth = 3.2 mm ($\frac{1}{8}$ in.).

10.1.5.2 The stress corresponding to 2 % strain is calculated as follows:

$$S = 3 PL/2 bd^2$$

where:

S = stress in the outer fiber at 2 % strain,

P = load corresponding to 2 % strain, N (lbf),

L = test span = 50 mm (2 in.),

d = specimen depth = 3.2 mm ($\frac{1}{8}$ in.),

b = specimen width = 12.7 mm ($\frac{1}{2}$ in.).

The secant modulus at 2 % strain is the ratio of stress to strain or $S/0.02$.

10.1.6 *Tensile Strength at Yield*—The tensile strength at yield shall be determined in accordance with Test Method D 638 except that rate of grip separation shall be 500 mm/min (20 in./min for materials in the density range from 0.910

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102	(2) S/C NO.: 614	(5) Pg 1 OF 1	(6) DATE 8/11/98
(3) S/C TITLE: Southern Waste Unit Excavation / On Site Disposal Facility Phase II		(11) RCI NO.: RCI-20102-024R	
RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(11) DCN NO.: 052 (BAS) 20102-046 Bldg	
(4A) RCI/DCN/TITLE: Fertilizer and Seeding Clarification			
(7) DOCUMENTS AFFECTED Technical Specifications	(7) DOCUMENT NOS. 20102-TS-0001	(7) REV. 0	(8) OTHER Section 02900 30
DCN 20102-046 8/24/98		0 8/24/98	

(9) ☒ RCI - INQUIRY ☐ USQD SCREENING BY PROJECT ENGINEER(9) ☐ DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

Paragraphs 2.1.G.2 and 2.1.G.3 of Technical Specification Section 02900 requires that fertilizer used for interim seeding shall be VCOTE 34-4-14, and that fertilizer used for permanent seeding shall be 0-12-12. Petro Environmental's vendor states that there is no such VCOTE 34-4-14 product, but rather is 34-0-14. Additionally, the vendor stated that there is no 0-12-12 fertilizer commercially available. Petro Environmental is requesting clarification on these two fertilizer specifications to determine if these are typographical errors. Please advise accordingly.

Additionally, Petro Environmental's vendor has reviewed the permanent seeding mixture and has informed Petro Environmental that Canada Wild Rye is not available anywhere until the fall harvest by the suppliers furnishing this seed to the seed companies. Should permanent seeding be required prior to the Canada Wild Rye becoming available, Petro Environmental would like to increase the Little Bluestem and Big Bluestem in equal proportions to replace the Canada Wild Rye quantity. Please advise accordingly.

ECDC CONTROLLED

COPY NO. C

(10) REQUESTER: J. Richard Schairbaum COMPANY: Petro Environmental Technologies, Inc. DATE: 8/11/98 (12) FCE / PE DON GOETZ DATE: 8/24/98 JAMES C. JENKINS

(13) RESPONSE FOR RCI, IS A DCN REQ'D ☐ NO ☒ YES(14) FOR DCN: ☐ APPROVED ☒ APPROVED AS NOTED ☐ DISAPPROVED

VCOTE 34-0-14 fertilizer is an acceptable alternative for interim seeding.
Modify specification section 2.1.G.3 to read as follows:
"Fertilizer for permanent seeding shall be 0-12-12, 0-4-4 or as approved by the Construction Manager. The nitrogen component must be zero."
Canada Wild Rye should be available for the permanent seeding season.

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL: Daniel G. Bodino DATE: (20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE N.A.
FIT ☐ FORM ☒ FUNCTION

(16) PDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEW ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) 5 James C. Jenkins DATE: 8/26/98

CONSTRUCTION CONCURRENCE DATE: (21) WORK COMPLETED: (SIGNOFF BY CE OR PE)

PURCHASE REQUISITION REQUIRED ☐ YES ☒ NO (19) 08/26/98

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- 1) VCOTE 34-0-14 is an acceptable alternative for interim seeding fertilizer.
- 2) Acceptable alternatives for the permanent seeding fertilizer mix are 0-4-4, 0-8-8, or equal. Fertilizer for permanent seeding shall have a 0 nitrogen component.

Revise technical specification 02900, 2.1.F.3 to read:

"Fertilizer for permanent seeding shall be 0-12-12, 0-4-4, 0-8-8, or approved equal."

GENERAL NOTE: Fertilizers must have MSDS submitted in accordance with 02900, 1.4.B.3

- 3) Canada Wild Rye should be available during the permanent seeding season, and therefore the permanent seed mix should be according to technical specification 02900.

This is the response from DWW

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1)WP / WO NO.: 20102		(2)S/C NO.: FSC-614 and P.O. 98-SC002317		(5)Pg 1 OF 1	(6)DATE 08Sept 98
(3)S/C TITLE: OSDF Phase II					(11)RCI NO.:
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A)RCI/DCN TITLE: Extrudate Welding Rod for GML		(11)DCN NO.: 20102-056	
(7)DOCUMENTS AFFECTED		(7)DOCUMENT NOS.	(7)REV	(8)OTHER	
20102-TS-0001 Section 02770		Part 2.02.C	0		
20102-TS-0001-Section 02770P		Part 2.01.D	1		
(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER			(9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE		
<p>The referenced technical specifications require additional discussion on the requirements for extrudate welding material for welding GML. Add the following paragraph to Specification Section 02770 as Part 2.02.C and Specification Section 02770P as Part 2.01.D.</p>			<p>"Extrudate welding material shall be of the same or compatible compound as the geomembrane supplied by the geomembrane manufacturer and shall be delivered in original sealed containers. Each container shall have a label bearing the brand name, manufacturer's lot number and directions as to storage. The manufacturer shall provide certificate of statement that the HDPE welding material is compatible with the project specifications and of the same or compatible resin as the geomembrane.</p>		
(10)REQUESTOR: Daniel Bodine	COMPANY: GeoSyntec	DATE: 08 Sept. 1998	(12)CE / PE <i>DON GOETZ</i> DATE: <i>9/9/98</i> <i>JAMES C. JENKINS</i> <i>9/10/98</i>		
(13)RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES			(14) FOR DCN <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED		
<p>ECDC CONTROLLED</p> <p>COPY NO. <i>C011</i></p>					
RCI - DCN ACCEPTANCE					
(15)DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: <i>Daniel Bodine</i> Daniel Bodine 09 Sept. 1998 <input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION			(20)CHARGE NO. FOR CADD SERVICES TO INCORPORATE: <i>N.A.</i>		
(16)FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)			DATE: <i>9/10/98</i>		
(17) PERFORMANCE GRADE: <i>5</i>			<i>James C. Jenkins</i>		
(18)CONSTRUCTION CONCURRENCE: DATE: <i>09/10/98</i>			(21)WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:		
(19) PURCHASE REQUISITION REQUIRED: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO					

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REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102		(2) S/C NO.: FSC-614		(5) Pg 1 OF 1	(6) DATE 9 Sept. 98
(3) S/C TITLE: OSDF Phase II					(11) RCI NO.:
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN TITLE: Nuclear Density Correlation CQA Plan		(11) DCN NO.: 20102-057	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.		(7) REV	(8) OTHER
Construction Quality Assurance Plan (20100-PL-006)		Pages 4-10, 6-5, 6-14 and 6-15		0	

(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER (9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

A change to the CQA Plan is being made to the requirements for the density correlation test which will allow the use of the drive cylinder test method (ASTM D 2937) or the sand cone test method (ASTM D 1556). Currently, the sand cone test method is only allowed. The drive cylinder test is an acceptable correlation test method and will likely be used more often than the sand cone method due to the occurrence of less gravel in the clay borrow material.

Page 6-5, Section 6.6.1 - Rewrite the third sentence in the last paragraph as follows: "The sand cone test method (ASTM D 1556) or drive cylinder test method (ASTM D 2937) shall be used to establish correlations of moisture and density in cases of uncertainty and as a check of the nuclear surface moisture/density gauge calibration."

Make the following changes to the CQA Plan:

Page 4-10, Section 4.4.3 - Rewrite the last bullet item as follows: "sand cone (ASTM D 1556) or drive cylinder (2937)."

Page 6-14 and 6-5, Tables 6-3 and 6-4, respectively. Rewrite the last test method description as follows: "Sand Cone/ASTM D 1556 or Drive Cylinder/ASTM D 2937"

(10) REQUESTOR: <i>Daniel Bodine</i> Daniel Bodine	COMPANY: GeoSyntec	DATE: 9 Sept. 1998	(12) CE / PE <i>Den Goer</i> JAMES C. JENKINS DATE: 9/15/98
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED			

ECDC CONTROLLED
COPY NO. C011

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: <i>Daniel Bodine</i> Daniel Bodine 9 Sept. 1998 <input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION		(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N.A.	
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)		DATE: 9/15/98	
(17) PERFORMANCE GRADE: 5 <i>James C. Jenkins</i>			
(18) CONSTRUCTION CONCURRENCE: DATE: 9/15/98		(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:	
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		000110	

ORIGINAL

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102	(2) S/C NO.: 614	(5) Pg 1 OF 1	(6) DATE 9/14
(3) S/C TITLE: Southern Waste Unit Excavation / On Site Disposal Facility Phase II		(11) RCI NO.: RCI-20102-028	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>	(4A) RCI/DCN/TITLE: Preparation of Trial Seams for HDPE Liner	(11) DCN NO.: 20102-058	
(7) DOCUMENTS AFFECTED OSDF Technical Specifications	(7) DOCUMENT NOS. 20102-TS-0001	(7) REV. 10 5	(8) OTHER Section 02770

(9) ☒ RCI - INQUIRY ☐ USQD SCREENING BY PROJECT ENGINEER(9) ☐ DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

Paragraph 3.02.H of Technical Specifications 02770 states that prior to actual seaming of the HDPE liner, trial seams must be prepared that are at least 15-ft. long by 1-ft. wide (after seaming). Petro Environmental is requesting that the 15-ft. length be reduced to the length required to ensure that the welder element goes through a full cycle of the heating element turning on, heating, shutting off, cooling of the wedge, and turning on again. It is estimated that the completion of this full cycle can be completed in approximately 5-ft. of length as opposed to the specified 15-ft. of length.

ECDC CONTROLLED

COPY NO.

(10) REQUESTER: J. Richard Schairbaum COMPANY: Petro Environmental Technologies, Inc. DATE: 9/14/98 (12) FCE / PE: James C. Jenkins

(13) RESPONSE FOR RCI, IS A DCN REQ'D ☐ NO ☒ YES (14) FOR DCN: ☐ APPROVED ☒ APPROVED AS NOTED ☐ DISAPPROVED

A length shorter than 15-ft may be used if completion of the above cycle is demonstrated. However, the length may be greater than 5-ft depending on actual field conditions.

RCI - DCN ACCEPTANCE

(16) DESIGN ORGANIZATION APPROVAL: Daniel Bodine DATE: (20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N.A.
☐ FIT ☒ FORM ☐ FUNCTION

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEW ARE COMPLETE: (DCN ONLY)

PERFORMANCE GRADE: (17) 5

(3) CONSTRUCTION CONCURRENCE:

DATE: (21) WORK COMPLETED: (SIGNOFF BY CE OR PE)

PURCHASE REQUISITION REQUIRED: ☐ YES ☒ NO (19)

000111

ORIGINAL

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / NO NO.: 20102		(2) S/C NO.: FSC-614		(5) Pg 1 OF	(6) DATE 9/17/98
(3) S/C TITLE: OSDF PHASE II				(11) RCI NO.:	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN TITLE: BORROW AREA - ADD'L. CLAY MATR'L.		(11) DCN NO.: 20102-05999	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV.	(8) OTHER	
PETRO BORROW AREA MANAGEMENT PLAN		20102-614-13000	-1	REV. 2 (614-PET-024) IPC	
Site Development Plan I - Option A		90X-6000-600203	2		
(9) <input type="checkbox"/> RCI - INQUIRY <input type="checkbox"/> USQD SCREENING BY PROJECT ENGINEER (9) <input checked="" type="checkbox"/> DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE • CURRENT BORROW AREA EXCAVATION IS COMPLETE. • REQUEST EXPANSION INTO ADDITIONAL BORROW AREA TO PROVIDE CLAY MATERIAL FOR CELL 3 LINER FOR FT99. THIS WILL ALLOW FOR EARLY START OF CELL 3 LINER AND ALSO ALLOW FOR CONTINUED USE OF SCREENING EQUIPMENT IN FT98. NEW MOBILIZATION COSTS FOR EQUIPMENT WILL NOT BE NECESSARY. <div style="text-align: center;"> ECDC CONTROLLED COPY NO. 0011 </div>					
(10) REQUESTOR: J.C. JENKINS		COMPANY: FDF		DATE: 9/18/98	(12) CE / PE: JENKINS C. JENKINS 9/18/98
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED Petro must submit a revised Borrow Area Management Plan. The limit of Option A Borrow Area Development as shown on Drawing 90X-6000-600203, Rev 2, is being expanded to the south.					
RCI - DCN ACCEPTANCE					
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: Daniel G. Bodine Daniel Bodine		DATE: 18 Sept. 98		(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:	
		<input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION			
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)					DATE: 9/18/98
PERFORMANCE GRADE: (17) 5 James C. Jenkins					9/18/98
(18) CONSTRUCTION CONCURRENCE:		DATE: 09/18/98		(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:	
PURCHASE REQUESTION REQUIRED: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO (19)		000112			

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1)WP / WO NO.: 20102		(2)S/C NO.: FSC-614		(5)Pg 1 OF 1	(6)DATE 28 Sept. 98
(3)S/C TITLE: OSDF Phase II					(11)RCI NO.:
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A)RCI/DCN TITLE: Sacrificial Geomembrane		(11)DCN NO.: 20102-060	
(7)DOCUMENTS AFFECTED		(7)DOCUMENT NOS.		(7)REV	(8)OTHER
Drawing 90X-6000-00224		Sheet G-41		0	
<p>(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER (9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE</p> <p>An addition to Note 5 is being made to provide and clarify requirements for the Sacrificial Geomembrane.</p> <p>Add the following new sentence to Note 5 after the first sentence.</p> <p>"Sacrificial Geomembrane shall Consist of UV Stabilized 30-mil Thick (min) High Density Polyethylene (HDPE) or Polyvinyl Chloride (PVC) Geomembrane. Seaming and installation of Sacrificial Geomembrane shall be in accordance with manufacturers recommendations."</p>					
(10)REQUESTOR: <i>Daniel Bodine</i> Daniel Bodine		COMPANY: GeoSyntec		DATE: 28 Sept. 1998	(12)CE / PE <i>Don Goetz</i> DATE: <i>9/29/98</i> <i>James C. Jenkins</i> <i>9/28/98</i>
(13)RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED					
RCI - DCN ACCEPTANCE					
(15)DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: <i>Daniel Bodine</i> Daniel Bodine 28 Sept. 1998 <input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION				(20)CHARGE NO. FOR CADD SERVICES TO INCORPORATE:	
(16)PDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)				DATE: <i>9/28/98</i>	
(17) PERFORMANCE GRADE: <i>5</i>		<i>James C. Jenkins</i>			
(18)CONSTRUCTION CONCURRENCE: <i>[Signature]</i> DATE: <i>9/28/98</i>		(21)WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:			
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input type="checkbox"/> NO					

ECDC CONTROLLED
COPY NO.

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Don

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

2064

(1) WP / WO NO.: 20102		(2) S/C NO.: 614	(5) Pg 1 OF 1	(6) DATE 2908 11/6/98
TITLE: Southern Waste Unit Excavation / On Site Disposal Facility Phase II			(11) RCI NO.: RCI-20102-037R	
RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN/TITLE: Cell 2 Access Ramp Construction		(11) DCN NO.: 20102-68
(7) DOCUMENTS AFFECTED Construction Drawings		(7) DOCUMENT NOS. 90X-6000-G-00222	(7) REV. 0	(8) OTHER

(9) ☒ RCI - INQUIRY ☐ USQD SCREENING BY PROJECT ENGINEER(9) ☐ DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

Petro Environmental is requesting to construct the cell access ramp into Cell 2 as indicated on the attached drawing, which differs from the original location as indicated in the Construction Drawings. Please issue a DCN to permit this change in location.

(10) REQUESTER: J. Richard Schairbaum
 COMPANY: Petro Environmental Technologies, Inc.
 DATE: 11/6/98
 (12) FCE / PE: DON GOETZ 11/6/98
 DATE: 11/6/98
 (13) RESPONSE FOR RCI, IS A DCN REQ'D ☐ NO ☒ YES
 (14) FOR DCN: ☐ APPROVED ☒ APPROVED AS NOTED ☐ DISAPPROVED

Approved as Noted on DCN 20102-68 sketch #1 attached.

(15) DESIGN ORGANIZATION APPROVAL: Daniel G. Badini 11/6/98		DATE: 11/6/98		(20) CHARGE NO. FOR CAD SERVICES TO INCORPORATE
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEW ARE COMPLETE: (DCN ONLY)		DATE: 11/6/98		
PERFORMANCE GRADE: (17) 5		DATE: 11/6/98		
CONSTRUCTION CONCURRENCE:		DATE: 11/6/98		(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:
PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		ECHO CONTROLLED COPY NO.		000114

C011

ORIGINAL

14301

CATCH (OPTIC

RAMP SKETCH

CCV

CELL 2 ACCESS
RAMP NO. 1
(BASE BID)
(NOTE 4)

CELL 2
NO. 2 (NOTE 6

See Sketch #1
DCN 20102-068
attached

IMPA
CATCH
AF

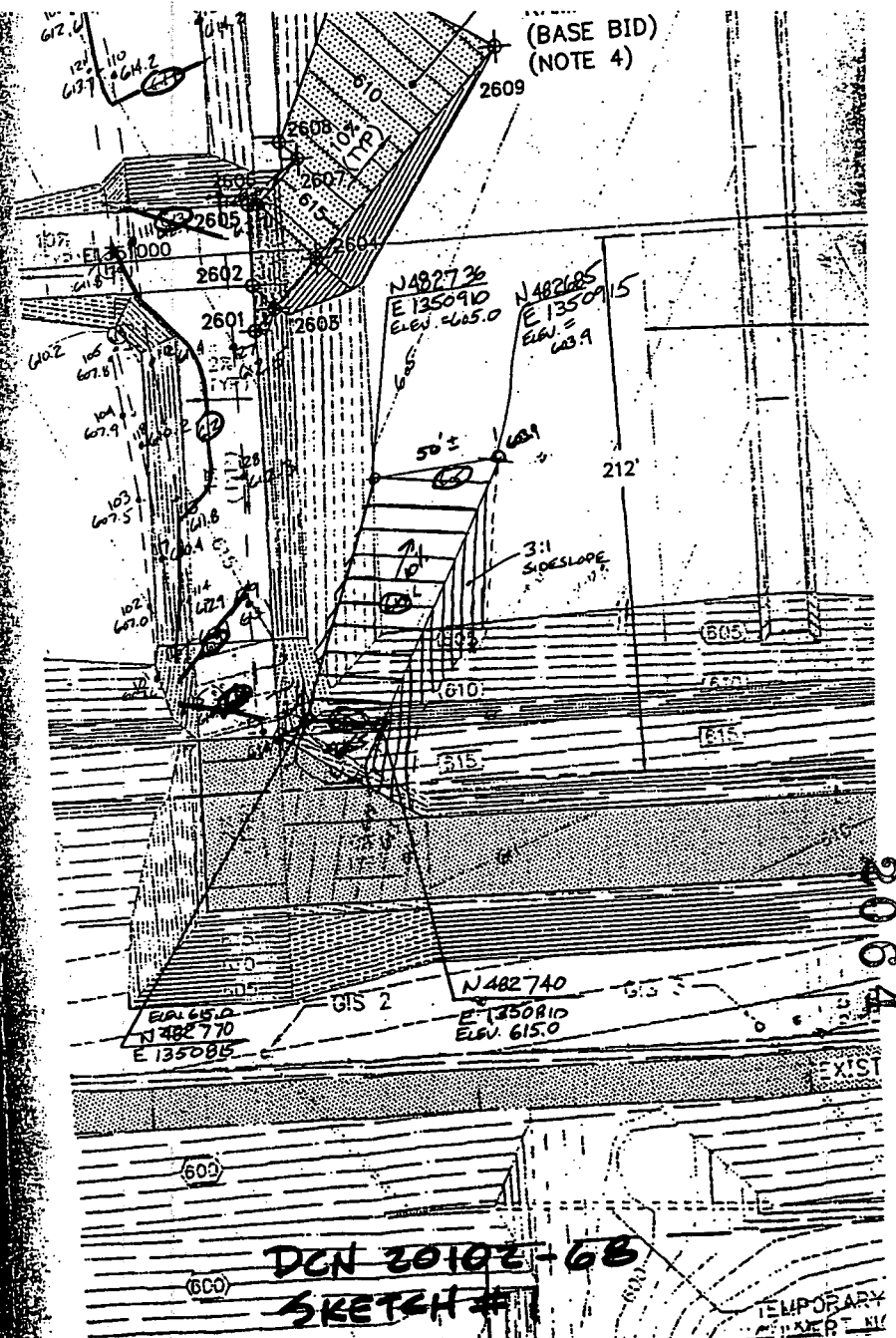
GTS 2 SCALE 1"=50'

000115

RCI 20102-37R EXISTING ACC

TEMPORARY ACCESS RAMP INTO CELL 2

1. FIELD VERIFICATION SHALL BE PERFORMED PRIOR TO CONSTRUCTION OF RAMP
2. RAMP MUST BE A MINIMUM OF 3 FEET ABOVE GEOMEMBRANE LINER.
3. COORDINATES SHOWN ARE APPROXIMATE.
4. FIELD VERIFICATION OF ALIGNMENT OF EXISTING ACCESS ROAD IS TO BE PERFORMED TO DETERMINE PROPER TURNING RADIUS.
5. THIS RAMP IS TEMPORARY. THE CLAY WEDGE SHALL BE CONSTRUCTED UPON COMPLETION OF RAMP USE AND OR AS APPROVED BY CONSTRUCTION MANAGER.
6. STONE SURFACE TO BE INSTALLED AT TOP OF RAMP (25' LENGTH (MIN)) WITH ODOT 304 OR APPROVED EQUIV. (6"-8" DEPTH MIN.) ELEVATION 615.0 TO 615.5.
7. RAMP SKETCHED REPLACES CELL 2 ACCESS RAMP NO. 1 AS SHOWN ON PHASE II CONSTRUCTION DWGS, DWG. 90X-6000-G-00222 AS PREPARED BY GEOSPINTEC CONSULTANTS.
8. RAMP PORTIONS ABOVE SELECT AND CLAY LINER MATERIAL ZONES SHALL BE COMPACTED TO 95% RHD.



000116

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102	(2) S/C NO.: 614	(5) Pg 1 OF 1	(6) DATE 11/20/98
(3) S/C TITLE: Southern Waste Unit Excavation / On Site Disposal Facility Phase II		(11) RCI NO.: RCI-20102-03	
(4) RCI/DCN/TITLE: Surfactant Use on Protective Layer in Cell 3		(11) DCN NO.: 20102-070	
(7) DOCUMENTS AFFECTED Construction Drawings		(7) DOCUMENT NOS. 90X-6000-G-00216	(7) REV. 2
			(8) OTHER Note 8.

(9) ☒ RCI - INQUIRY ☐ USQD SCREENING BY PROJECT ENGINEER(9) ☐ DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

Note 8 on the above referenced construction drawing calls for the use of a 12-mil temporary plastic cover to be placed over the Protective Layer on the south side of the Cell 2/3 Intercell Berm. Petro Environmental is requesting that in lieu of using a temporary plastic cover, the use of a Pine Sap Emulsion be permitted to be sprayed over the Protective Layer to serve as a surfactant over the winter months. Please consider issuing a DCN to permit this change.

ORIGINAL

ECDC CONTROLLED
COPY NO. 0011

(10) REQUESTER: J. Richard Schairbaum	COMPANY: Petro Environmental Technologies, Inc.	DATE: 11/20/98	(12) FCE / PE: <i>Don Goetz</i> JAMES C. JENKINS
(13) RESPONSE FOR RCI, IS A DCN REQ'D <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/> YES		(14) FOR DCN: <input type="checkbox"/> APPROVED <input checked="" type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVE	
<p>In accordance with Note 8 Construction Manager may approve an equivalent cover. The use of an Pine Sap Emulsion to serve as a surfactant is placed/sprayed in accordance with site procedures is acceptable. See Page 2 of this DCN for a revision of Note 8 on Drawing G-00216 Rev. 2.</p>			
RCI - DCN ACCEPTANCE			
(15) DESIGN ORGANIZATION APPROVAL: <i>George W. ...</i> 30 Nov 1998	DATE: 30 Nov 1998	(20) CHARGE NO. FOR CAD SERVICES TO INCORPORATE 2CCDB	
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEW ARE COMPLETE: (DCN ONLY)		DATE: 11/30/98	
PERFORMANCE GRADE: (17) 5 James C. Jenkins		(21) WORK COMPLETED: (SIGNOFF BY CE OR PE)	
(8) CONSTRUCTION CONCURRENCE: <i>[Signature]</i>		DATE: 11/30/98	
PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO (19)		000117	

Response to RCI No. 20102-038R
Changed to DCN No. 20102-070
(Dated 11/30/98, Page 2 of 2)

Pine Sap Emulsion is acceptable for use in active or future cells if approved by the Construction Manager. The following two sentences shall be added to Note 8 on Drawing No. 90X-6000-G-00216 Rev. 2.

When approved by the Construction Manager the use of Pine Sap Emulsion as an erosion control crusting agent is an acceptable alternative to the 12-mil Temporary Plastic Cover. The emulsion shall conform to applicable paragraphs of Specification Sections 2270 and 13010.

Ranil Bodomo
30 Nov. 1998

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1)WP / WO NO.: 20102		(2)S/C NO.: FSC-614		(5)Pg 1 OF 2	(6)DATE 2 Dec. 98
(3)S/C TITLE: OSDF Phase II					(11)RCI NO.:
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A)RCI/DCN TITLE: Backfill Requirements for Anchor Trenches		(11)DCN NO.: 20102-071	
(7)DOCUMENTS AFFECTED		(7)DOCUMENT NOS.		(7)REV	(8)OTHER
Drawing 90X-6000-G-00215		Sheet G-22B		2	
(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER			(9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE		
<p>A change to the Construction Drawing Details for backfilling of the secondary and primary anchor trenches is being made to provide more efficient construction and still comply with regulatory, design and good construction requirements. First, the geotextile filter located between the LCS Stone Layer and the Protective Soil Layer, that currently terminates within the primary anchor trench, may terminate on top of the backfilled anchor trench. Second, backfill for both the primary and secondary anchor trench shall be clay liner material compacted to minimum 95 percent of the maximum dry unit weight determined by ASTM D698 and identified on the drawing details as clay layer material (3).</p> <p>This second change removes the requirement that the anchor trench clay backfill fall within the Acceptable Permeability Zone (APZ). This design change is acceptable, and maintains the minimum 3 ft. thickness of clay liner material below and to the sides of the anchor trenches and 2 ft. clay cap thickness above the backfilled anchor trenches.</p> <p>Drawing 90X-6000-G-0215, Rev. 2 shall have Details 16, 17, 18 and 19 revised to show the changed anchor trench geotextile filter and backfill requirements shown in the attached sketch on page 2 of this DCN.</p>					
(10)REQUESTOR: <i>Daniel Bodine</i> Daniel Bodine		COMPANY: GeoSyntec		DATE: 3 Dec. 1998	
(12)CE / PE		DATE:			
(13)RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED					
RCI - DCN ACCEPTANCE					
(15)DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: <i>Daniel Bodine</i> 3 Dec 98 Daniel Bodine 3 Dec. 1998 <input checked="" type="checkbox"/> RIT <input type="checkbox"/> FORM <input type="checkbox"/> FUNCTION				(20)CHARGE NO. FOR CADD SERVICES TO INCORPORATE:	
(16)PDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)					DATE:
(17) PERFORMANCE GRADE:					
(18)CONSTRUCTION CONCURRENCE:		DATE:		(21)WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:	
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input type="checkbox"/> NO					

000119

ETER BERM

PROTECTIVE CLAY
LAYER (NOTE 6)

SANDBAG (TYP)

SACRIFICIAL GEOMEMBRANE

PROTECTIVE LAYER (N
LCS DRAINAGE LAYE
LDS DRAINAGE LAYER

COMPACTED CLAY LINE

SUBGRADE

GEOTEXTILE CUSHION
GEOMEMBRANE LINER
GEOSYNTHETIC CLAY LINER

CONSTRUCTION CONTROL
POINT (TYP) (NOTE 4)

DETAIL

LINER SYSTEM ANCHOR TRENCH AND PROTECTIVE CLAY LAYER

(NOTE 8)
SCALE: 1" = 4'
REF: F98X163E

2064

Page 2 of 2
DCN No
20102-071

000120

M

2064

OSDF Phase I Cell 1 (1702)

000121

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

2064	
(1) WP / WO NO.: 1702	(2) S/C NO.: FSC-587 <i>MC</i> 547 220-98
(5) Pg 1 OF 1 (6) DATE 02/20/98	
(3) S/C TITLE: On-Site Disposal Facility - Phase I	
(4) RESPONSIBLE DISCIPLINE: EO MO CX OTHERO	(4-A) RCI/DCN TITLE: Material Transfer Area Changes
(11) RCI NO.: 1702-0XX	
(11) DCN NO.: 1702-051	
(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.
20100-SK-004	0
20100-SK-005	0
(8) OTHER	
(9) <input type="checkbox"/> RCI - INQUIRY <input type="checkbox"/> USQD SCREENING BY PROJECT ENGINEER <input checked="" type="checkbox"/> DCN-JUSTIFICATION; EXISTING CONDITION & REQUESTED/PROPOSED CHANGE	
<p>A the request of the Utility Engineer, FEMP site Engineering evaluated protection of fire main FQI-5-12-LI located 68' ± east of "E" Street under the Material Transfer Area. To adequately protect the fire main, a minimum of 5' cover will be constructed from top of pipe to top of driving surface. The crushed rock pavement above the pipe will minimum 18" depth, #2 stone, 8' ± wide centered along the pipe. Grading in the Material Transfer Area to be adjusted with the approval of the Project Engineer for cut/fill balance and to provide drainage to catch basins and generally south.</p> <p>Due to off-season construction conditions, transfer area and haul road compaction will be evaluated by the Project Engineer based on proof rolling in lieu OSDF Project referenced ODOT placement and compaction specifications. Aggregate placed in max. 9" lifts.</p> <p>Mirafi HP570 is acceptable as a substitute for the specified geogrid and separator fabric. Special efforts, such as wrapping fabric between lifts, to be a the discretion of the Project Engineer.</p> <p>Provide and install 1000 SY of the original specification geogrid to be installed at the three entrance/exit points or at other locations identified by the Project Engineer.</p>	
(10) REQUESTOR: <i>[Signature]</i> COMPANY: Fluor Daniel Fernald	DATE: 2/20/98 (12) FCE / PE <i>[Signature]</i> DATE: 02/24/98
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED	
ECDC CONTROLLED COPY NO. C011	
RCI - DCN ACCEPTANCE	
(15) DESIGN ORGANIZATION APPROVAL: <i>[Signature]</i> DATE: 2/20/98	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: Not Applicable
(16) OSDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) <i>[Signature]</i> DATE: 2/20/98	
PERFORMANCE GRADE: (17) 5	
(18) CONSTRUCTION CONCURRENCE: <i>[Signature]</i> DATE: 02/24/98	(21) WORK COMPLETED: (SIGN-OFF BY FCE OR PE) DATE:
PURCHASE REGISTRATION REQUIRED: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO (19)	

ORIGINAL

000122

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1)WP / WO NO.: 1702		(2)S/C NO.: FSC-587		(5)Pg 1 OF 1	(6)DATE 04/06/98
(3)S/C TITLE: On-Site Disposal Facility - Phase I					(11)RCI NO.: 1702-0XX
(4) RESPONSIBLE DISCIPLINE: EO MO CX OTHER		(4-A)RCI/DCN TITLE: 100' Survey Grid for Material Placement			(11)DCN NO.: 1702-052
(7)DOCUMENTS AFFECTED		(7)DOCUMENT NOS.	(7)REV.	(8)OTHER	
Specification 02100 - Surveying					

(9) ☐ RCI - INQUIRY ☐ USQD SCREENING BY PROJECT ENGINEER ☒ DCN JUSTIFICATION: EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

Change Specification 02100 - Surveying to require 100' grids rather than 50' grids. Larger grids provide adequate control at a cost savings and can be coordinated with Impacted Material Placement Plan requirements.

INFORMATION
ONLY

RECEIVED
MAY 05 1998
R. Eusman

(10)REQUESTOR: <i>D. Spry</i>	COMPANY: For Daniel Fernald	DATE: 01/06/98	(12)FCE / PE <i>[Signature]</i>	DATE: 04/06/98
(13)RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES		(14)FOR DCN: <input type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED		
100 Ft grids are not adequate to provide survey control for the cell design and construction. This was evident during cell 1 construction.				

RCI - DCN ACCEPTANCE

(15)DESIGN ORGANIZATION APPROVAL: <i>Daniel Bodine</i>	DATE: 7 April 98	(20)CHARGE NO. FOR CADD SERVICES TO INCORPORATE: Not Applicable
(16)FDF PE ACCEPTANCE & VERIFICATION THAT ALL-REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) PERFORMANCE GRADE: (17) <i>5</i>		DATE: 4/7/98
(18)CONSTRUCTION CONCURRENCE: <i>[Signature]</i>	DATE: 04/07/98	(21)WORK COMPLETED: (SIGN-OFF BY FCE OR PE) <i>NA</i>
PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO (19) FS-F-4259 (10/01/96)		DATE: 04/07/98

000123

ORIGINAL

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

2064

(1) WP / WO NO.: 1702		(2) S/C NO.: FSC-587 597 mc 4/22/98		(5) Pg 1 OF 1	(6) DATE 04/14/98
(3) S/C TITLE: On-Site Disposal Facility - Phase I				(11) RCI NO.: 1702-0XX	
(4) RESPONSIBLE DISCIPLINE: EO MO CX OTHER		(4-A) RCI/DCN TITLE: Sampling Well Gravel Access Lanes			(11) DCN NO.: 1702-053
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.		(7) REV.	(8) OTHER
Change Order #26 102 4/22/98					
90-6000 G-00017 OOX-5500-X-01783		G-5		78	
(9) <input type="checkbox"/> RCI - INQUIRY <input type="checkbox"/> USQD SCREENING BY PROJECT ENGINEER <input checked="" type="checkbox"/> DCN-JUSTIFICATION; EXISTING CONDITION & REQUESTED/PROPOSED CHANGE					
See attached page. The sampling well access lanes are needed by the FDF environmental monitoring organization due to changes in the FEMP site configuration. Details in Attachment #1 and Sketch 20100-SK-009 Sheets 1 through 4.					
(10) REQUESTOR: JES Ellis		COMPANY: Fluor Daniel Fernald		DATE: 4/21/98	(12) FCE / PE DATE: 4/21/98
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED					
ECDC CONTROLLED COPY NO. C011					
RCI - DCN ACCEPTANCE					
(15) DESIGN ORGANIZATION APPROVAL: A. Kuntze			DATE: 4/22/98	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: Not Applicable	
<input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION					
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 4/22/98					
PERFORMANCE GRADE: (17) 5					
(18) CONSTRUCTION CONCURRENCE P. R. White			DATE:	(21) WORK COMPLETED: (SIGN-OFF BY FCE OR PE) DATE:	
PURCHASE REQUISITION REQUIRED: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO (19)					

FS-P4259 (02/18/98)

ORIGINAL

000124

SAMPLING WELL ACCESS LANES

DCN 1702-053

Attachment #1

Construct four gravel access lanes to groundwater sampling wells and air sampling stations as shown on sketch #20100-SK-009, sheets 1 through 4. Unless otherwise noted, pavement section to be constructed at grade. All lanes to be constructed on geotextile separator fabric on subgrade (OSDF Spec. #02714), 6"- #2 crushed stone capped with 4" ODOT Item #304 crushed stone. Driving surface to be 10' wide, bottom width to vary with topography. Driving surface compaction will be evaluated by the Project Engineer based on proof rolling in lieu OSDF Project referenced ODOT placement and compaction specifications. These lanes are identified below and are detailed on the noted Sketch sheet.

- Lane #1** (Sheet 1 of 4) Construct Lane #1 between the OSDF Sedimentation Basin and the Impacted Material Sed Basin from the old North Access Rd to the existing gravel lane (175 LF±). At the OSDF Sed Basin, construct a vehicle turn area 10' ± wide x 20 ± LF on the earthen baffle. Provide adequate stone for a maximum grade of 4:1. At the southwest corner of the sed basin, construct a gravel path, 4' wide x 6" deep x 30 LF±, of ODOT Item #304 down the embankment to the air monitor. Maximum grade of walking surface to be 3:1.
- Lane #2** (Sheet 2 of 4) Construct Lane #2 from the former Fire Training Facility Road into the NE corner of the new rail yard (70 LF ±). Maximum grade to be 4:1. Provide and install a 7' x 20' double-leaf chain link gate in the north fence of the new rail yard 50' ± from the east fence. Lane #2 is to terminate at a 25' x 25' turnaround.
- Lane #3** (Sheet 3 of 4) Construct Lane #3 from the LCS Manhole Access Corridor Turnaround southwest to well #22201 (100 LF ±).
- Lane #4** (Sheet 4 of 4) Construct Lane #4 parallel to the N. Access Road from Well # 2424 to Well # 22198 (770 LF±) and an east- west lane south of Well #22199 extending to the east property line fence and then north to the air monitor (285 LF±, total 1055 LF±). Remove existing construction fence around borrow pond. Construct new borrow pond perimeter fence 5' ± from shoulder of bank, steel posts 12' o.c. or less. Provide and install ring buoys 1 per 200 LF of perimeter fence and install hazard signs provided by FDF. Grade area east of Lane #4 and south of east-west lane for surface drainage into the borrow pond. Install 2 - 4" x 16 LF± HDPE culverts, provided by FDF, under the east-west lane near the borrow pond, bed and cover the conduit with ODOT Item #304, meet existing elevation. Excavate a "V" bottom overflow swale north from the northeast corner of the borrow pond, 2' deep x 6' wide x 300 LF±

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 1702		(2) S/C NO.: 597		(5) Pg 1 OF 3	(6) DATE 4/15/98
(3) S/C TITLE: ON SITE DISPOSAL FACILITY PHASE I					(11) RCI NO.:
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN TITLE: AIR MONITORING STATIONS, CELL 1			(11) DCN NO.: 1702-054
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV.	(8) OTHER	
90X-6000-4-00078, 00079			0		
(9) <input type="checkbox"/> RCI - INQUIRY <input type="checkbox"/> USQD SCREENING BY PROJECT ENGINEER (9) <input checked="" type="checkbox"/> DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE • FDF ENGINEERING HAS DESIGNED THE NEW POWER SOURCE FOR AIR MONITORING STATIONS AROUND CELL 1. REF. RES 3471 AND FDF MEMO M:SWP(ENG):98-0085. DCN PAGES 2 & 3 ARE SKETCHES FROM REF. 3471. • THE DIRECT BURIED CABLE SHALL BE INSTALLED 8 FT. OUTSIDE THE BASE LINE PERIMETER BERM WHICH IS EXTERNAL TO ANY OF THE LINER SYSTEM. IT IS ALSO EXTERNAL TO THE FINAL COVER SYSTEM GEOSYNTHETIC LINER. THE CABLE SHALL BE BURIED 2 FT. BELOW EXISTING GRADE AND ABANDONED IN PLACE AS THE FINAL COVER SYSTEM IS CONSTRUCTED AND AIR MONITORING RECEPTACLES ARE REMOVED.					
(10) REQUESTOR: J. C. JENKINS		COMPANY: FDF	DATE: 4/15/98	(12) CE / PE <i>James C. Jenkins</i>	DAT 4/15/98
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES			(14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED		
RCI - DCN ACCEPTANCE					
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: <i>Samuel Bodine</i>			DATE: 15 April 98	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:	
<input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION					
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)					
PERFORMANCE GRADE: (17) 5			<i>James C. Jenkins</i> 4/15/98		
(18) CONSTRUCTION CONCURRENCE: <i>James C. Jenkins</i>			DATE:	(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) ECDC CONTROLLED	
PURCHASE REQUISITION REQUIRED: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO (19)			COPY NO. C011		

**Fernald
Environmental Restoration
Management Corporation**

PO Box 398704
Cincinnati, Ohio 45239-8704
(513) 738 6200

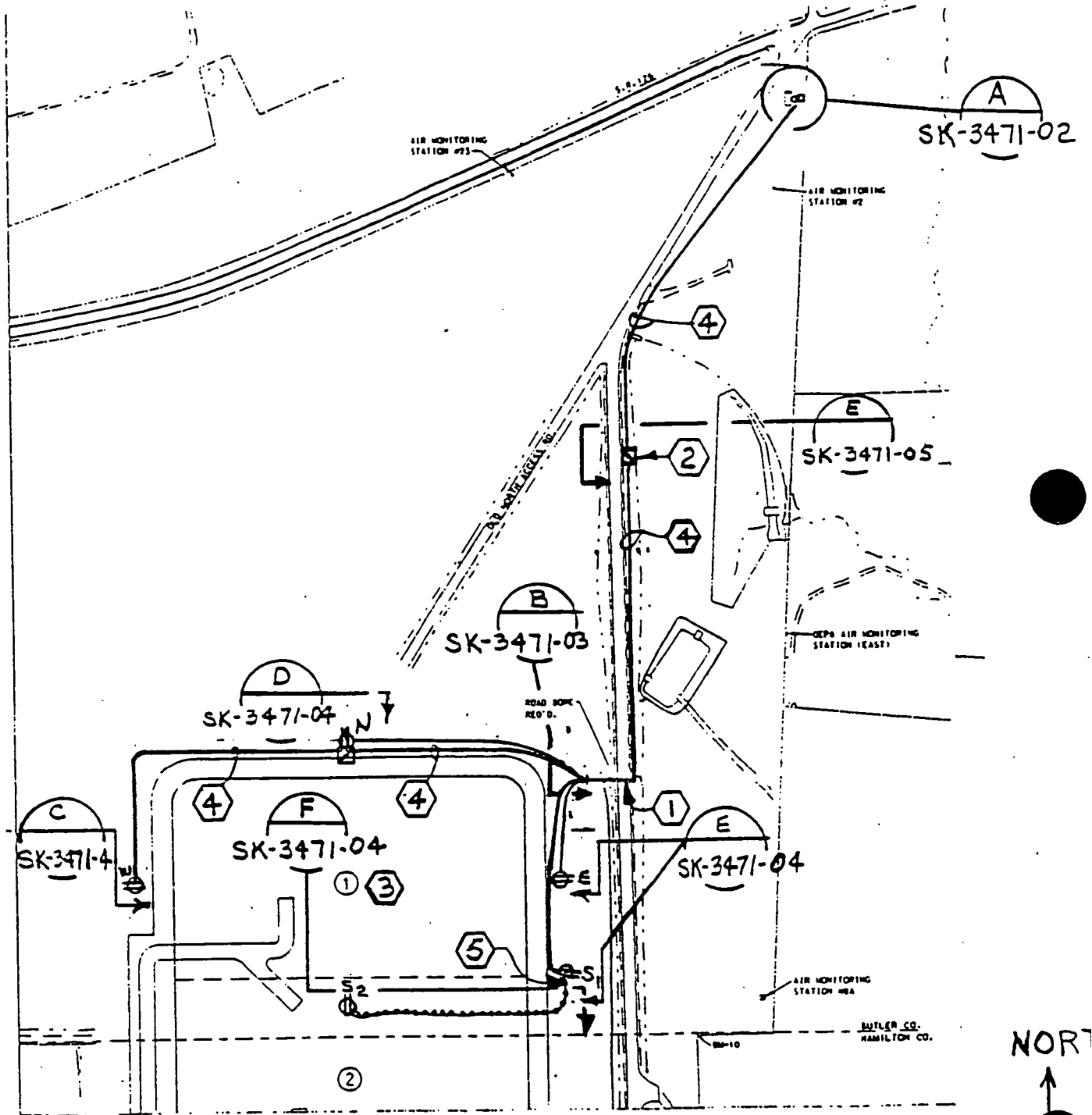
DCN 1702-054

Pa. 2 OF 3

ENGINEERING CALCULATION

PROJECT NUMBER:	RES-3471
BY:	A.L. BURWINK
DATE:	3-16-9
PAGE:	OF
REVISED:	SK-3471-0

SUBJECT: **O.S.D.F. MONITORS**



GENERAL NOTES:

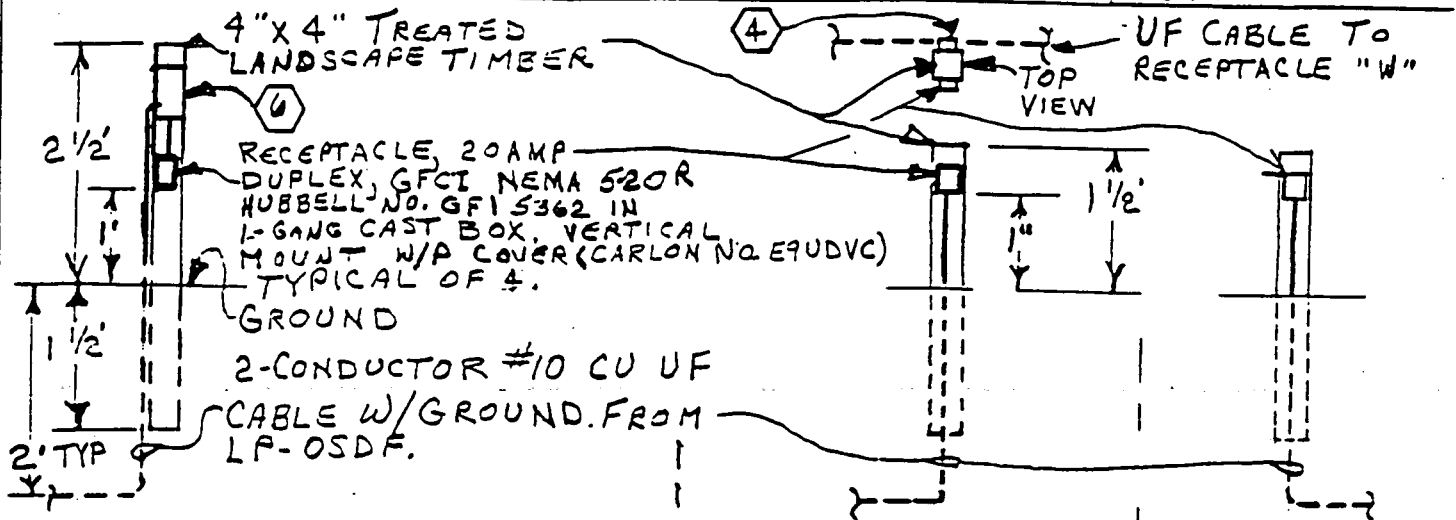
1. SEE SKETCH SK-3471-06 FOR GENERAL NOTES
2. SEE SKETCH SK-3471-05 FOR SPECIFIC NOTES
3. USE ANTI-OXIDANT COMPOUND FOR ALUMINUM WIRE CONNECT

000127

NORTH

SUBJECT:

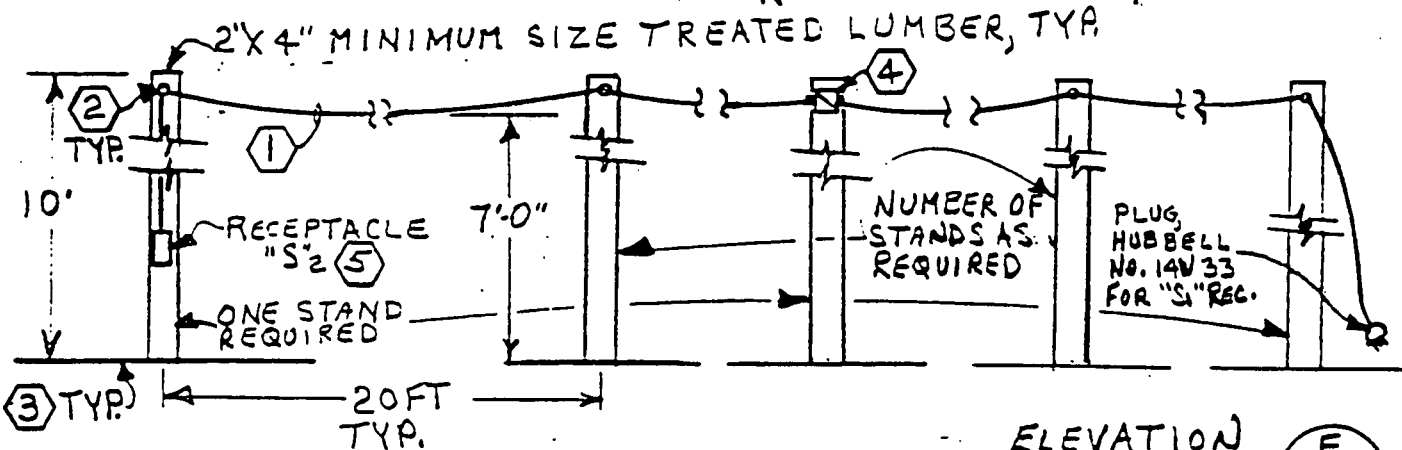
O.S.D.F. MONITORS



ELEVATION C
RECEPTACLE- SK-3471-01
"W"

ELEVATION D
RECEPTACLE- SK-3471-01
"N"

ELEVATION E
RECEPTACLE SK-3471-01
"E" & "S"



ELEVATION F
PORTABLE STANDS FOR TEMPORARY WIRING SK-3471-01

NOTES:

- ① 3-CONDUCTOR #12 TYPE SO CORD.
- ② DRILL 1" DIA. HOLE THROUGH LUMBER 2" FROM END.
USE A HEAVY DUTY LASHING CABLE TY-RAP TO ATTACH CABLE TO THE LUMBER, SHALL BE BLACK ULTRAVIOLET RESISTANT NYLON.
- ③ BUILD BASE LARGE ENOUGH FOR SAND BAGS.
- ④ INSTALL NEMA 3R CAST BOX WITH BLANK COVER, SHALL BE USED AS JUNCTION BOX TO SPLICE CABLE, WHERE CORD IS USED, USE STRAIN RELIEF CORD GRIPS, ADD LABEL "GFCI PROTECTED".
- ⑤ USE STANDARD HUBBELL #5362 IN 1-GANG FS BOX W/CARLON #EQUUDVC.
- ⑥ INSTALL BOOST TRANSFORMER IF 115 VOLTS IS NOT ACHIEVABLE.

000128

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1)WP / WO NO.: 1702		(2)S/C NO.FSC-597		(5)Pg 1 OF 1	(6)DATE 5May1998
(3)S/C TITLE: Phase 1 Construction					(11)RCI NO.:
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A)RCI/DCN TITLE: Air Pressure Testing			(11)DCN NO.: 1702-055
(7)DOCUMENTS AFFECTED		(7)DOCUMENT NOS.		(7)REV	(8)OTHER
20100-TS-0002 Section 02605 Part 3.07.D		20100-02605		0	
(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER			(9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE		
<p>Specification Section 02605 requires the carrier pipe to be hydrostatically pressure tested at 50 psi for SDR 26 pipe (LCS project) and 120 psi for SDR 11 pipe (Phase I and II projects). The specification also allows the use of air pressure testing in lieu of hydrostatic testing when approved in writing by the Construction Manager. Taking into account safety considerations and the connections of portions of the pipe to the Liner Penetration Boxes the following specification change is recommended.</p>			<p>Add the following sentence to Section 02605 Part 3.07.D for Project 20100. "If air pressure testing is approved and is used to final test installed HDPE solid wall carrier pipe between the Cell and LCS/LDS Manholes a minimum test pressure of 15 psig shall be used." Note that test durations remain unchanged.</p>		
(10)REQUESTOR: <i>Amiel Bodin</i>		COMPANY: <i>Gasintec</i>		DATE: <i>5 May 98</i>	(12)CE / RE <i>[Signature]</i> DATE: <i>5/5/98</i>
(13)RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED					
<p>ECDC CONTROLLED</p> <p>COPY NO. 0011</p>					
RCI - DCN ACCEPTANCE					
(15)DESIGN ORGANIZATION APPROVAL/DISAPPROVAL:DATE: <i>5 May 98</i> <i>Amiel Bodin</i> <input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input checked="" type="checkbox"/> FUNCTION			(20)CHARGE NO. FOR CADD SERVICES TO INCORPORATE: <i>NA</i>		
(16)PDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: <i>5/5/98</i>					
(17) PERFORMANCE GRADE: <i>+</i>					
(18)CONSTRUCTION CONCURRENCE: <i>[Signature]</i> DATE: <i>05/05/98</i>			(21)WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:		
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

5068

(1) WP / WO NO.: 1702		(2) S/C NO.: FSC-597		(5) Pg 1 OF 4	(6) DATE 05/18/98
(3) S/C TITLE: OSDF PHASE I CONSTRUCTION					(11) RCI NO.:
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RC/DCN TITLE: EQUIPMENT DECONTAMINATION FACILITY BERM			(11) DCN NO.: 1702-056
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV.	(8) OTHER	
EQUIPMENT DECONTAMINATION FACILITY DETAILS SHEET G-37A		90X-6000-G-00086	0		
IMPACTED MATERIAL HAUL ROAD GRADING PLAN SHEET G-14A		90X-6000-G-00199	0		
ACCESS CORRIDOR EXTENSION TO I.M. HAUL ROAD SKETCH		1702-SK-001	0		
(9) <input type="checkbox"/> RCI - INQUIRY <input type="checkbox"/> USQD SCREENING BY PROJECT ENGINEER			(9) <input checked="" type="checkbox"/> DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE		
<p>CONSTRUCT AGGREGATE BERMS AT THE EAST AND WEST ENDS OF THE DECONTAMINATION PAD AS SHOWN ON SKETCH 20100-SK-013 AND SKETCH 20100-SK-012. LEAVE A TWO (2) FOOT MINIMUM OPENING IN THE NORTH END OF THE WEST BERM TO ALLOW RUNOFF FROM THE IMPACTED MATERIAL HAUL ROAD TO DRAIN INTO THE DECONTAMINATION FACILITY.</p> <p>GRADE THE IMPACTED MATERIAL HAUL ROAD SURROUNDING THE DECONTAMINATION FACILITY TO DRAIN INTO THE FACILITY. SEE ATTACHED SKETCH 1702-SK-001, REVISION 1.</p> <p>CHANGE SECTION A/G-37A ON EQUIPMENT DECONTAMINATION FACILITY DETAILS (SHEET G-37A) AND IMPACTED MATERIAL HAUL ROAD GRADING PLAN (SHEET G-14A) TO REFLECT CHANGES ON ATTACHED SKETCHES.</p>					
<p style="text-align: center;">ECDC CONTROLLED</p> <p style="text-align: center;">COPY NO.</p> <p style="text-align: center;">RECEIVED</p> <p style="text-align: center;">JUN 24 1998</p> <p style="text-align: center;">KBT</p> <p style="text-align: right;">05/27/98</p>					
(10) REQUESTOR: RICK HEATH		COMPANY: PDF	REQ. DATE: 06/14/98 05/18/98	(12) CE / PE J. C. JENKINS DATE: 5/27/98	
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES <i>See Page 5 for Response</i>			(14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED		
GEOSYNTEC			RCI - DCN ACCEPTANCE		
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: <i>Samuel Bodin</i>		DATE: 2 PM 28	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2CCDB		
<input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION					
(16) PDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: <i>James C. Jenkins</i> 6/17/98					
PERFORMANCE GRADE: (17)		DATE:		(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:	
(18) CONSTRUCTION CONCURRENCE: <i>06/18/98</i>		DATE:			
PURCHASE REQUISITION REQUIRED: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO (19)					

000130

**FERNALD
ENVIRONMENTAL RESTORATION
MANAGEMENT CORPORATION**

ENGINEERING CALCULATION

PROJECT NUMBER 2CC08	
BY R.E. HEATH	DATE 5/18/98
CHECKED BY MMR	DATE 5/19/98
PAGE 1	OF 1

SUBJECT: EQUIPMENT DECONTAMINATION FACILITY

REVISION:

CONSTRUCT BEAMS OF TREATED LUMBER AND BASE AGGREGATE AT EAST + WEST ENTRANCE + EXIT OF THE EQUIPMENT DECON- TAMINATION FACILITY TO PREVENT RUNOFF OF EQUIPMENT WASH WATER

ADD RAILROAD TIES AND TREATED 2X10s AS SHOWN AT EAST + WEST END OF DECON FACILITY

NAIL 2X10s TO EXISTING TIES WITH 20d GALVANIZED NAILS

FILL OVER BOARDS WITH COMPACTED BASE AGGREGATE AS SHOWN

NEW 2X10s (typ)

NEW RAILROAD TIES

NEW BASE AGGREGATE

BASE AGGREGATE

EXISTING END TIE AT EAST + WEST END

EXISTING SURFACE

DRAINAGE CORRIDOR

GRAVEL

LINEAR SYSTEM

SUBBASE

EXISTING RAILROAD TIE (ADJ EBY)

EXISTING OFF RAMP

LEAVE A 2 FOOT MINIMUM GAP IN THE NORTH END OF THE WEST BERM TO ALLOW RUNOFF FROM THE HAUL ROAD TO ENTER THE DECON FACILITY

Sketch #20100-SK-0
DCN 1702-056

Sheet 2 of 4

SCALE 1" = 1'

000131

2064

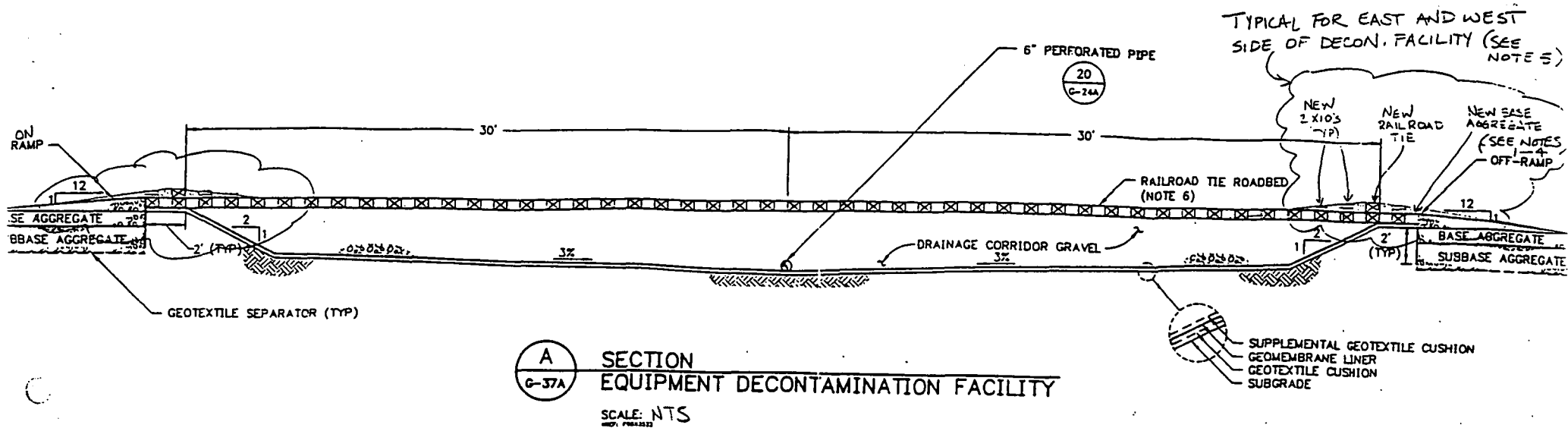
(13) Response to DCN 1702-056

28 May 1998
Page 5 of 5

This DCN is approved as noted below:

1. Use ODOT 304 Aggregate for the New Base Aggregate noted on DCN Sheet 3.
2. Sketch 1702-SK-001, DCN Sheet 4, base drawing is not the latest revision. See Response to DCN 1702-047 and Rev. 0, Drawing 90X-6000-G00199.
3. Aggregate berms may require significant maintenance or replacement from time to time especially after undergoing freeze thaw cycles.
4. Submit detail of 2-foot gap that is intended to collect and transfer drainage into facility. A gratted box culvert or pipe located at the north side of the northwest corner may be more suitable.

000132



NOTES:

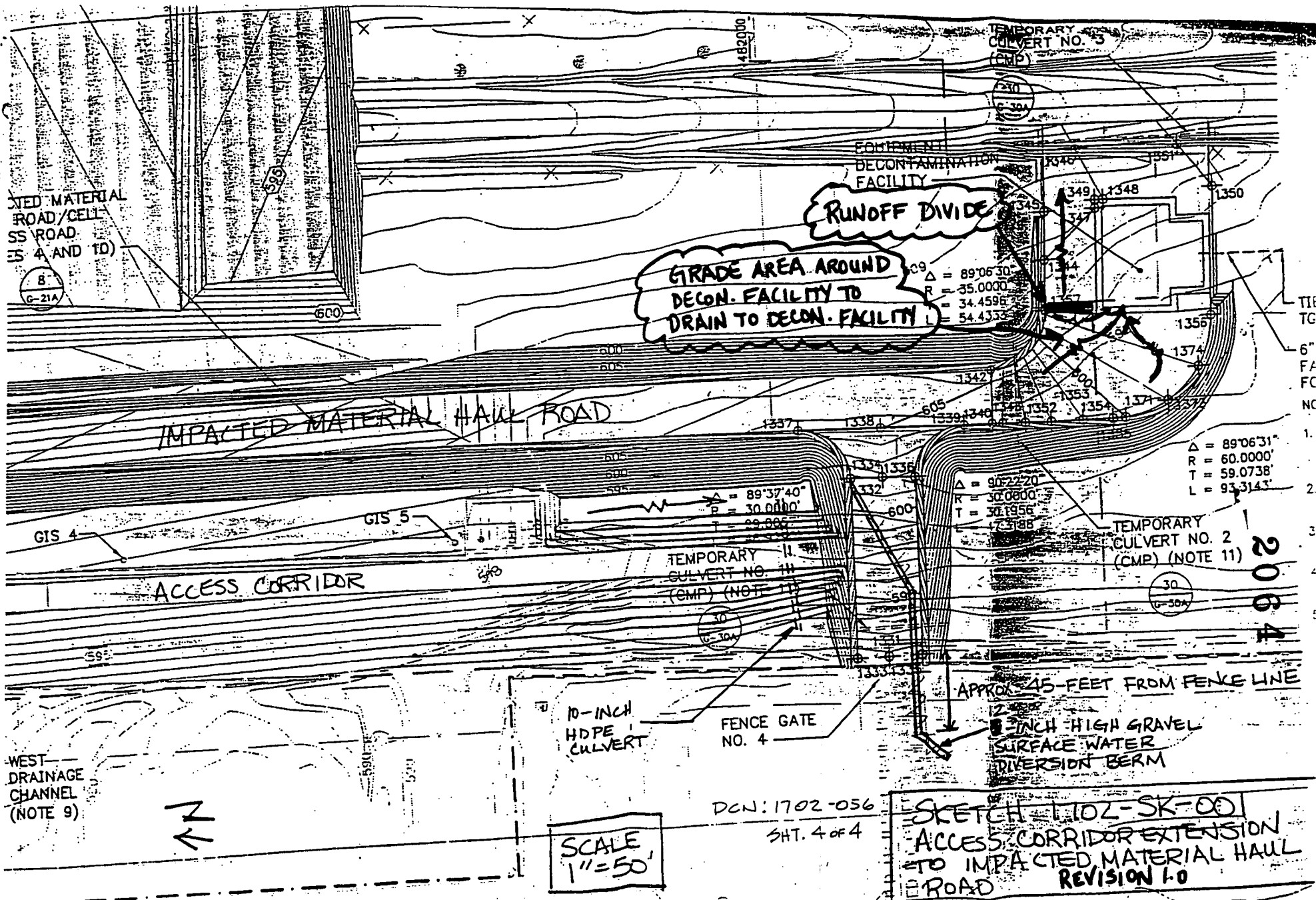
1. NEW BASE AGGREGATE SHALL BE ODOT 301 STONE.
2. SPREAD 5 BAGS OF PORTLAND CEMENT (APPROX. 90 LBS EACH) ON EAST AND WEST AGGREGATE BERM.
3. WORK CEMENT INTO AGGREGATE TO A DEPTH OF APPROX. 2 INCHES.
4. WET CEMENT WITH A FINE MIST OF WATER SO AS NOT TO WASH AWAY THE CEMENT.
5. SEE SKETCH 20100-SK-012 FOR DETAILS OF BERM.

EQUIPMENT DECONTAMINATION
FACILITY BERM

SKETCH 20100-SK

PREPARED BY: UN D.

000133



REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

2 008

(1)WP / WO NO.: 1702 (2)S/C NO.: FSC-597 (5)Pg 1 OF 1 (6)DATE 05/19/98

(3)S/C TITLE: On-Site Disposal Facility - Phase I (11)RCI NO.: 1702-0XX

(4) RESPONSIBLE DISCIPLINE: E □ M □ C X OTHER □ (4-A)RCI/DCN TITLE: Equipment Wash Facility Manhole Modifications (11)DCN NO.: 1702-057

(7)DOCUMENTS AFFECTED	(7)DOCUMENT NOS.	(7)REV.	(8)OTHER
90* 6000 - G - 00086	G - 37A	0	
90* 6000 - G - 00090	G - 37B	0	

(9)RCI - INQUIRY □ USQD SCREENING BY PROJECT ENGINEER X DCN JUSTIFICATION; EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

- Delete from scope of work reinforced concrete manhole cover slab, steel cover, and cover frame of the Equipment Wash Facility sump.
- In lieu of the concrete pad, cover the manhole with the HDPE cover from the LCS clean-out manhole near the Wash Facility.
- Excavate to 2" ± above the clean out flange and compact the soil.
- Cover the flange with an 18" or larger, steel plate 1/4" thick or 3/4" treated plywood.
- Provide compacted backfill to grade.
- Provide coordinates and elevation of clean out flange.

(10)REQUESTOR: [Signature] COMPANY: Fluor Daniel Fernald DATE: 05/19/98 (12)FCE / PE: Don Goetz JAMES C. JENKINS J.C. Jenkins 5/19/98

(13)RESPONSE: FOR RCI, IS A DCN REQ'D? □ NO □ YES (14)FOR DCN: □ APPROVED X APPROVED AS NOTED □ DISAPPROVED

See page 2 for Response

ECDC CONTROLLED

COPY NO. C011

RECEIVED
MAY 19 1998
R Eisman

GEOSTYTEC

RCI - DCN ACCEPTANCE

(15)DESIGN ORGANIZATION APPROVAL: [Signature] DATE: 5/28/98 (20)CHARGE NO. FOR CADD SERVICES TO INCORPORATE: Not Applicable

(16)FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 5/28/98

PERFORMANCE GRADE: (17) 5 JAMES C. JENKINS JAMES C. JENKINS 5/28/98

(18)CONSTRUCTION CONCURRENCE: [Signature] DATE: 05/28/98 (21)WORK COMPLETED: (SIGN-OFF BY FCE OR PE) DATE:

PURCHASE REQUISITION REQUIRED: X YES □ NO (19)

FS-F-4259 (02/16/98)

000135

This DCN addresses two different construction design change requests. The first deletes from the scope of work the reinforced concrete manhole cover slab, steel cover, and cover frame of the Equipment Decontamination Facility manhole. The steel cover is to be replaced with a HDPE cleanout manhole cover that has been used for a LTS temporary gravity line cleanout manhole. Justification for this change was not given, but is believed to save construction costs. The concept of this change is acceptable and approved as noted below.

1. Replace the manhole cover with a minimum 1-inch thick HDPE flat stock cover attached to the manhole with hinge and locking hasp. The cover should be attached such that it will open in the south direction. This will permit east access and maintenance from the north.
2. Construct a minimum 36-inch walkway to the manhole from the existing 3-foot wide platform located directly north of the platform. The walkway shall be constructed using 3 supporting railroad ties and 2"x 6" No. 2 Pressure Treated Boards nailed to the ties. Additional drainage corridor gravel shall be placed around the manhole to support the walkway and as partial replacement of the concrete slab. These materials are the same as used in the facility roadbed construction and, therefore, require no additional submittal data. The lengths of the materials shall be field cut to fit the as-built conditions. The purpose of the walkway is to provide safe access to the manhole for inspection and maintenance, which was one of the original requirements of the concrete cover slab.

The second construction design change is related to the Temporary Gravity Line (TGL) cleanout located west of the Equipment Decontamination Facility (originally located at Station 12+00, Drawing 90X-6000-G-0057, sheet G-8A). Changes are necessary because the revised location of the TGL resulted in the cleanout falling within the Impacted Material Haul Road. This DCN proposes to excavate to within 2-inches of the top of the cleanout flange, compact the soil and cover the flange with a 8-inch or larger $\frac{1}{4}$ steel plate or $\frac{3}{4}$ -inch treated plywood. This change is acceptable in concept and approved as noted below.

1. Excavate soil from around the cleanout manhole and cleanout pipe to permit lowering the 2-foot diameter manhole to minimum 2-inches above the top of the cleanout flange.
2. Fill and compact subbase aggregate around and to the top of the manhole. Fill the inside of the manhole with rounded gravel (No. 57 suggested). Place minimum 1-inch thick 5-ft x 5-ft steel plate over the top of the manhole and subgrade.
3. Place and compact subbase and base aggregate over the steel plate in accordance with drawings and specifications.
4. Provide survey coordinates and elevation of the top of the cleanout flange.

Note that access to the cleanout is possible only after re-excavating the haul road base aggregate. This portion of the TGL is temporary and it is likely that this cleanout may never be used. The heavy steel plate is required because of the truck loading and turning conditions at that location.

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE.

(1) WP / WO NO.: 1702		(2) S/C NO.: 597		(3) Pg. OF 1	(5) DATE 6/5/98
(3) S/C TITLE: OSDF (Phase I)				(11) RCI NO.: 1702-026R	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN TITLE: Temporary Vegetation Seed Mix		(11) DCN NO.: 1702-059	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV.	(8) OTHER	
OSDF Phase I Technical Specs.		02930-2.01.A	0	Table 02930-2	
(9) <input checked="" type="checkbox"/> RCI - INQUIRY C USOD SCREENING BY PROJECT ENGINEER (9) <input type="checkbox"/> DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE					
<p>3000 2 RMB</p> <p>Table 02930-2 requires that the "warm season" seed mix include 80 lbs./ac. of Sudangrass. Schebor Landscaping is requesting this seed mix be changed as Sudangrass is a marsh grass that is typically grown only in California. Schebor Bros. recommends replacing the Sudangrass with 80 lbs./ac. of Linn Perennial Rye, an aggressive rye grass that thrives well in this area and climatic conditions. All other seed mix items (i.e. - oat, annual ryegrass) remain unchanged. Schebor Bros. will guarantee this seed mix and their work.</p>					
(10) REQUESTOR: J. R. Dehaene		COMPANY: Petro Environmental		DATE: 6/5/98	
(10) REQUESTOR: J. R. Dehaene		COMPANY: James C. Jenkins		DATE: 6/5/98	
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED					
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: <i>Ronald Bodino</i> DATE: 8 JUN 98 <input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION					
(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N.A.					
(16) PDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)					
PERFORMANCE GRADE: (17) 5 <i>James C. Jenkins</i> DATE: 6/8/98					
(18) CONSTRUCTION CONCURRENCE: <i>James R. Jenkins</i> DATE: 6/8/98					
PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO (19)					
(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:					

000137

ORIGINAL

ECDC CONTROLLED

COPY NO.

C011

2064

Leachate Conveyance System (1700)

000138

2064 REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 1700		(2) S/C NO.: 589	(3) Pg. OF 1	(5) DATE 12-17-97
(3) S/C TITLE: LEACHATE CONVEYANCE SYSTEM			(11) RCI NO.:	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input type="checkbox"/> OTHER <input type="checkbox"/>	(4A) RCI/DCN TITLE: 12" FQ PRESSURE TEST		(11) DCN NO.: 1700-082	
(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER	
VBS SUBMITAL # 90				

(9) RCI - INQUIRY ☐ USQD SCREENING BY PROJECT ENGINEER (9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

REQUEST PERMISSION TO TEST 12" FQ WITH AIR RATHER THAN WATER.

12" F.Q. LINE IS BURIED FROM COMH #6 TO SECOND ST. WITH NO CAPABILITY TO VENT, MAKING HYDROTEST VIRTUALLY IMPOSSIBLE.

IF APPROVED - WHAT PRESSURE?

(10) REQUESTOR: COMPANY: VILLAGEBURG DATE 12/18/97 (12) FCE / PE J.C. Jenkins DATE 12/18/97

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? ☐ NO ☐ YES (14) FOR DCN, ☒ APPROVED ☐ APPROVED AS NOTED ☒ DISAPPROVED

see Parsons comment sheet (1 of 1)
JML

INFORMATION
ONLY

1997 DEC 19 PM 12:40

(15) DESIGN ORGANIZATION APPROVAL: (17) (PARSONS) 29 DEC 97		RCI - DCN ACCEPTANCE		(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N.A.	
(16) FCE/PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) 1/5/98					
PERFORMANCE GRADE: (17) 5 James C. Jenkins		DATE 1/5/98		(21) WORK COMPLETED: (SIGNOFF BY FCE OR PE) DATE	
(18) CONSTRUCTION CONCURRENCE: Richard L. McQueen		DATE 1/5/98		(21) WORK COMPLETED: (SIGNOFF BY FCE OR PE) DATE	
PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO (19)					

FS-F-4259 (10/01/86)

received
12-17-97

ORIGINAL

000139



NOCHNIGHT REVIEW COMBENT DIRECT[illegible]

000110

SIGNIFICANT REVIEW COMMENT RESOLUTION APPROVAL SIGNATURE:

DATE:

2064

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 1700		(2) S/C NO.: 589		(5) Pg 1 OF 2	(6) DATE 2/24/98
(3) S/C TITLE: LEACHATE CONVEYANCE SYSTEM					(11) RCI NO.:
(4) RESPONSIBLE DISCIPLINE: EX MD CD OTHER		(10) RCI/DCN TITLE: ADDITIONAL INSTRUMENTATION/CONTROLS			(11) DCN NO.: 1700-083
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV.	(8) OTHER	
92X-5900-N-00322			0		
92X-5900-E-00324			0		
(9) RCI - INQUIRY <input type="checkbox"/> USQD SCREENING BY PROJECT ENGINEER <input type="checkbox"/> (9) DCN JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE <p>OPERATIONS (AWWT) REQUESTED THE FOLLOWING INSTRUMENTATION AND CONTROLS TO ENSURE BETTER OPERATIONS AND MONITORING OF THE LEACHATE PUMPING SYSTEM.</p> <ul style="list-style-type: none"> • REPROGRAM CHART RECORDER FOR RATE AND TOTALIZATION. • PROVIDE TWO DIFFERENT AUDIBLE ALARMS IN AWWT CONTROL RM. WHICH MEET IH NOISE LIMITATIONS • PROVIDE VALVE POSITION INDICATOR FOR LIFT STATION VALVE V-001 AT THE AWWT CONTROL PANEL <p>(SEE SHEET 2 OF 2)</p>					
(10) REQUESTOR: J.C. JENKINS		COMPANY: FDF	DATE: 2/24/98	(12) FCE / PE: J.C. Jenkins	
(13) RESPONSE: FOR RCI IS A DCN REQ'D? <input type="checkbox"/> NO <input type="checkbox"/> YES			(14) FOR DCN: <input type="checkbox"/> APPROVED <input checked="" type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED		
<p>1) SEE PARSONS ATTACHED COMMENT SHEET (PAGE 1 OF 1) WITH ATTACHED MARKUPS TO CONTROL INTERFACE REDLINES</p> <p>2) SEE ATTACHED EMAIL RECORD (3/2/98) WHICH DESCRIBED UPDATES SOME OF THE CHANGES CONTROL INTERFACE IS MAKING</p> <p style="text-align: right;">EUDC CONTROLLED</p> <p style="text-align: right;">COPY NO. C011</p>					
(PARSONS)		RCI - DCN ACCEPTANCE			
(15) DESIGN ORGANIZATION APPROVAL: Carlton Schroeder		DATE: 3/2/98	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2 CUP 5		
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)					
PERFORMANCE GRADE: (17) 5		James C. Jenkins			
(18) CONSTRUCTION CONCURRENCE: Richard L. McArthur		DATE: 3/10/98	(21) WORK COMPLETED: (SIGNOFF BY FCE OR PE)		
PURCHASE REQUISITION REQUIRED: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO (19)		DATE: 3/4/98			

FST-4259 (10/01/96)

ORIGINAL

received
2/24/98 YA

000141

ATTACHMENT 2 - RCI/DCN SUPPLEMENT

REQUEST FOR CLARIFICATION OF INFORMATION/
DESIGN CHANGE NOTICE SUPPLEMENT

(11) RCI NO.:	(11) DCN NO.:	(11) PROJECT/NO NO.:	(5) PAGE OF
	1700-083	1700	2 2

RCI-INQUIRY / DCN-JUSTIFICATION, EXISTING CONDITION, & REQUESTED CHANGE (continued):

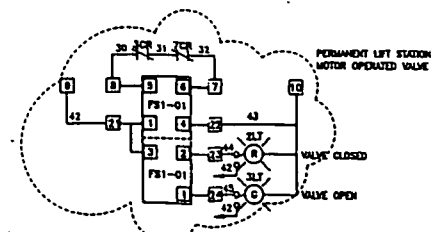
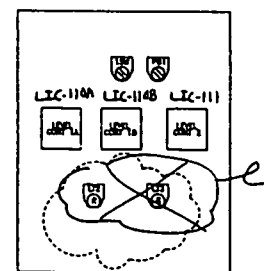
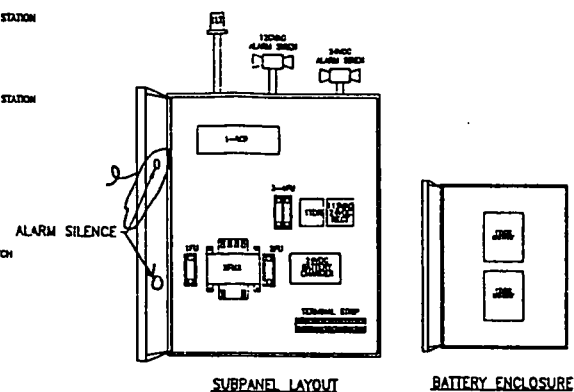
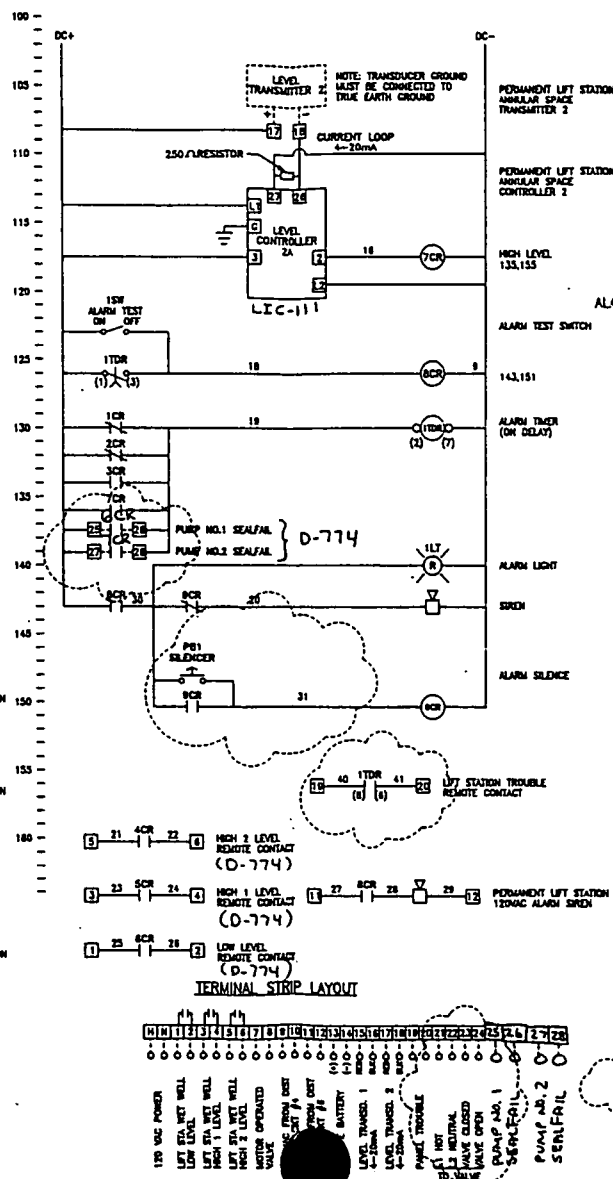
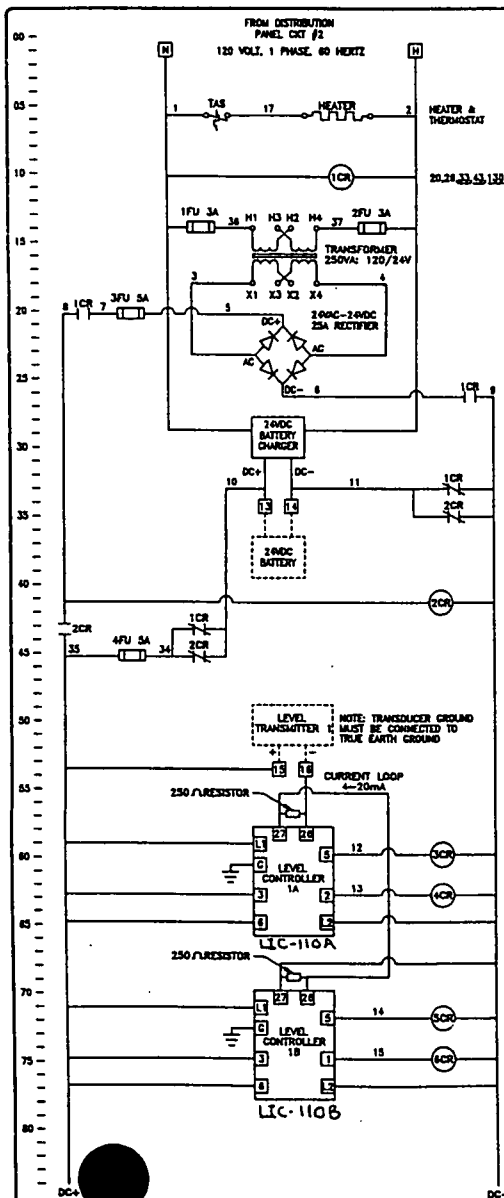
- INSTALL CONTROL TO TRANSMIT A HIGH LEVEL ALARM IN LIFT STATION AT 4.5 FEET (4'-6")
- MODIFY HIGH LEVEL ALARM TO CLOSE VALVE V-001 AT 3'-6" BUT NOT SOUND ALARM.
- PROGRAM PLC TO ALARM AT 30% DIFFERENTIAL AND 50% SHUT-OFF. (REF. DCN 1700-081) INCLUDES CALIBRATION OF FLOW METERS
- DISABLE SIREN AT LIFT STATION

RESPONSE (continued):

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	REV.	(8) OTHER

Q

 $\frac{1}{4}$



ITEMS REDUCING ELECTRICAL CHARGE

□ - INDICATES FIELD WIRING TERMINALS
FOR CONNECTIONS MADE BY DISTRI.

(3) - INDICATES COMPONENT TERMS

CONTROL INTERFACE, INC.
COMMERCIAL DIV.

EXECUTIVE SUMMARY

DATE	BY	REVISION
------	----	----------

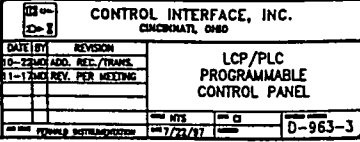
BT-2500	ADD SILENCE PW
	CHANGED TIMER TO
	ON DELAY

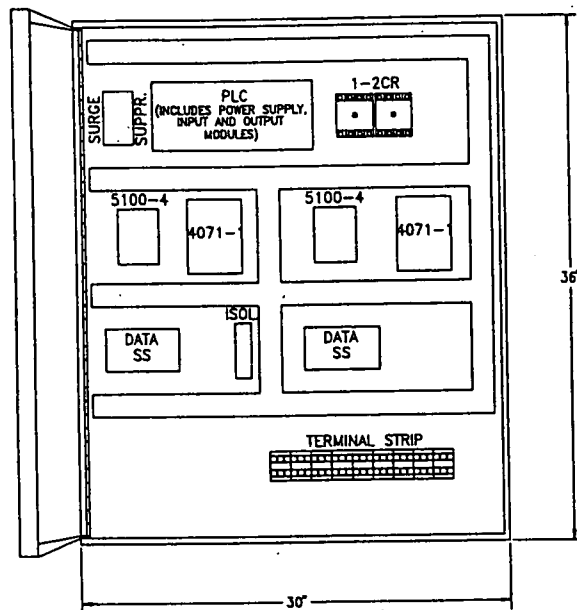
12-1	DCS-1700-075
------	--------------

PERMANENT LIFE STATION
LEVEL CONFINEMENT

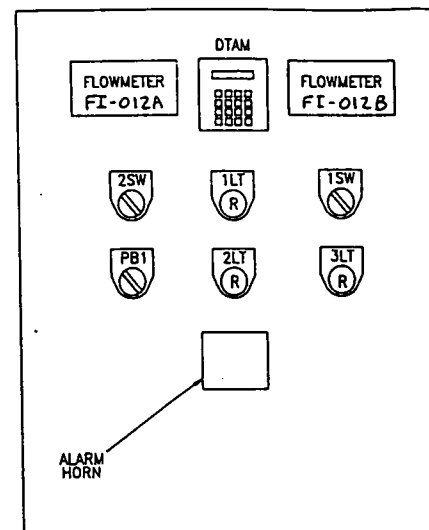
100

IS THIS NOT DIRECT
WIRING NOW?





SUBPANEL LAYOUT



ENCLOSURE LAYOUT

WALL MOUNTED

CHART RECORDER
FQR-012B

000146

- - INDICATES FIELD WIRING TERMINALS FOR CONNECTIONS MADE BY INSTALLER
- (X) - INDICATES COMPONENT TERMINALS
- (—) - INDICATES REMOTE WIRING

DATE: 10-1-81		REVISION: 1	
CONTROL INTERFACE, INC. CINCINNATI, OH 45202			
10-22-81 ADD. REC./TRANS.		11-17-81 REV. PER MEETING	
LCP/PLC PROGRAMMABLE CONTROL PANEL		963-31	

Author: Rick McGuire at FNST-03
Date: 3/2/98 9:59 AM
Priority: Normal
Receipt Requested
TO: Carlton Schroeder at FEFE-27-ERAFS1-A
TO: Jim Sayatovic at PARREMOTE
CC: James Jenkins at FNST-02
Subject: Control Interface Proposal

----- Message Contents -----

Carlton,

The cc:Mail message below may affect DCN No. 1700-083 which is in your house now. Please review before responding to the DCN.

Thanks,

Rick McGuire

----- Forward Header -----

Subject: Control Interface Proposal
Author: Timothy Arnold at FNST-03
Date: 3/2/98 8:30 AM

Rick,

I have a few comments on Control Interface's proposal #E117:

1. Item #1; this should have been supplied after the first installation. Red-lined drawings and manuals must be provided when ever field changes are made during installation.
2. Item #2-F; eliminate. We have already installed and calibrated the flow meters in manholes #1 and #11. They are displaying properly at AWWT.
3. Item #2-G; add to this item a disk copy of the PLC programming logic and instruction to our instrument techs on maintenance and reprogramming.

If you have any questions please give me a call.

..Tim

3. Item #2-H; eliminate. This alarm has already been disabled as your DCN should document.

DCN 1700-83

000147

DOCUMENT REVIEW COMMENT SHEET

SITE/OWNER		REVIEWING DIVISION: PARSONS		DATE: 3/3/98	
DOCUMENT NO. AND TITLE DCN-1700-083 ADDITIONAL INSTRUMENTATION /				DATE COMMENTS DUE:	
REQUEST NO.: CONTROLS - LEACHATE CONVEYANCE SYSTEM					
ITEM NO.	NAME OF REVIEWER	PAGE NO./ STEP	COMMENT	SRC ✓	COMMENT RESOLUTION
1	SCHROEDER		PARSONS UNDERSTANDS THE CHANGES/MODS DESCRIBED		
			IN THIS DCN ARE BEING MADE BY CONTROL INTERFACE		
			AND THAT ANY DESIGN ASSOCIATED WITH THE CHANGES IS BEING DONE BY CONTROL INTERFACE.		
2	SCHROEDER		AT THE COMPLETION OF ALL CHANGES FDF/CONTROL INTERFACE		
			WILL FURNISH PARSONS A NEW "REDLINE(S)" SHOWING ALL THESE CHANGES AND		
			THAT PARSONS WILL USE TO PREPARE "AS-BUILTS" OF THE		
			DRAWINGS & SPECS IT HAS BE PREPARED.		
3	SCHROEDER		ATTACHED SEE MARKUPS TO REDLINES PREVIOUSLY FURNISHED TO PARSONS. PLEASE ALSO UPDATE THE		

"REDLINES" TO REFLECT ALL AS-BUILT CONDITIONS IN MARK-UP AREAS

SIGNIFICANT REVIEW COMMENT RESOLUTION APPROVAL SIGNATURE: _____

DATE _____

4 SCHROEDER

" Please CONTINUE TO CLOUD
" REDLINE " CHANGES

000148

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 1700		(2) S/C NO. FSC-589		(5) Pg 1 OF 1	(6) DATE 5 May 1998
(3) S/C TITLE: Leachate Conveyance System				(11) RCI NO.:	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN TITLE: Air Pressure Testing		(11) DCN NO.: 1700-084	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV	(8) OTHER	
20110-TS-0002 Section 02605 Part 3.07.D		20110 - 02605	0		
LCS DCN No. 1700-033					
(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER Specification Section 02605 requires the carrier pipe to be hydrostatically pressure tested at 50 psi for SDR 26 pipe (LCS project) and 120 psi for SDR 11 pipe (Phase I and II projects). The specification also allows the use of air pressure testing in lieu of hydrostatic testing when approved in writing by the Construction Manager. Taking into account safety considerations and the connections of portions of the pipe to the Liner Penetration Boxes the following specification change is recommended.			(9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE Add the following sentence to Section 02605 Part 3.07.D for Project 20110. "If air pressure testing is approved and is used to final test installed HDPE solid wall carrier pipe between the Cell and LCS/LDS Manholes a minimum test pressure of 15 psig shall be used." Note that test durations and DCN 1700-033 remain unchanged.		
(10) REQUESTOR: <i>Paul Boston</i> COMPANY: <i>GeoSyntec</i> DATE: <i>5 May 98</i>		(12) CE / PE <i>James E. J. Rina</i> DATE: <i>5/5/98</i>			
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED <div style="text-align: right;"> ECDC CONTROLLED COPY NO. C011 </div>					
RCI - DCN ACCEPTANCE					
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: <i>5 May 98</i> <i>Paul Boston</i> <input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION			(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: <i>N/A</i>		
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: <i>5/6/98</i>					
(17) PERFORMANCE GRADE: <i>4</i>					
(18) CONSTRUCTION CONCURRENCE: DATE: <i>05/06/98</i> <i>[Signature]</i>			(21) WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:		
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					

ORIGINAL 000149

APPENDIX U:

CELL 2 NON-CONFORMANCE REPORTS (NCR)

**GeoSyntec Consultants
Fluor Daniel Fernald
Petro Environmental Technologies**

2064

GeoSyntec Consultants

000151

GEOSYNTEC CONSULTANTS NONCONFORMANCE REPORT LOG

NCR Number	Date Discovered	Originator	Assessment Activity	Responsible Organization/ Project	Description	Date Corrective Action Approved	Date of Verification of Corrective Action	Date NCR Closed
20102-001	6-Aug-98	Daniel Bodine	Construction QC	GeoSyntec Consultants/ OSDF Phase II	Field Nuclear/Density test no. 2-48 was incorrectly recorded as a passes test. Test No. 2-49 was a retest and should have been correctly recorded on the Test Log.	11-Aug-98	2-Sep-98	11-Sep-98
20102-002	6-Aug-98	Daniel Bodine	Construction QC	GeoSyntec Consultants/ OSDF Phase II	Test Nos. 2-93 and 2-94 field moisture contents were more than the limit of 3 percentage points of the standard Proctor optimum moisture, but still were considered passing tests.	11-Aug-98	11-Sep-98	11-Sep-98
20102-003	11-Aug-98	Ned Meekins	Construction QC	Petro Environmental Technologies	Screened clay liner soils were used as compacted clay liner, from stockpile 98-5, before lab testing was complete.	11-Sep-98	11-Sep-98	11-Sep-98
20102-004	25-Aug-98	Collin Sukow	Construction QC	GeoSyntec Consultants/ OSDF Phase II	Field Nuclear Density/Moisture test nos. 2-276 and 2-277 had field moisture contents of greater than the limit of 3 percentage points wet of the standard proctor optimum moisture content, thereby falling outside of the APZ.	11-Sep-98	11-Sep-98	11-Sep-98
20102-005	28-Aug-98	Collin Sukow	Construction QC	Petro Environmental Technologies	Screened clay liner soils were used as compacted clay liner from stockpile 98-10 before lab testing was complete.	11-Sep-98	11-Sep-98	11-Sep-98
20102-006	1-Sep-98	Collin Sukow	Construction QC	Petro Environmental Technologies	Screened clay liner soils were used as compacted clay liner from stockpile 98-11 before lab testing was complete.	11-Sep-98	11-Sep-98	11-Sep-98

** Not Applicable to Cell 2 Construction*

GEOSYNTEC CONSULTANTS NONCONFORMANCE REPORT LOG

NCR Number	Date Discovered	Originator	Assessment	Responsible Organization/ Project	Description	Date Corrective Action Approved	Date of Verification of Corrective Action	Date NCR Closed
20102-007	2-Sep-98	Collin Sukow	Construction QC	GeoSyntec Consultants/ OSDF Phase II	Moisture contents greater than the limit of 3 percentage points wet of the standard proctor optimum moisture content, thereby falling outside of the APZ.	11-Sep-98	11-Sep-98	11-Sep-98
20102-008	10-Aug-98	Collin Sukow	Construction QC	GeoSyntec Consultants/ OSDF Phase II	The drive tube method was used for the moisture/ density correlation to the nuclear moisture/density gauge reading instead of the sand cone method.	11-Sep-98	11-Sep-98	11-Sep-98
20102-009	9-Sep-98	Daniel Bodine	Resident Eng. & Construction QC	GeoSyntec Consultants & FDF P.O. 98-SC002317	Rolls of material that were delivered to the site were not the rolls that were expected to be delivered, therefore there was no conformance testing performed on these rolls.	19-Sep-98	20-Oct-98	20-Oct-98
20102-010 *	16-Sep-98	Daniel Bodine	Resident Eng. & Construction QC	Petro Environmental Technologies	Construction placement of impacted materials had advanced without placement of the select impacted material.	17-Sep-98		
20102-011	9-Sep-98	Collin Sukow	Construction QC	Petro Environmental Technologies	Sieve samples failed the project specs. with approx. 70% passing the 1/2 in. sieve. Spec 02710, part 2.01.B, requires a min. of 80 % passing the 1/2 in. sieve.	23-Sep-98	23-Sep-98	23-Sep-98
20102-012	26-Sep-98	Collin Sukow	Construction QC	Petro Environmental Technologies	Deployment of GML continues in cell 2 with destructive samples not being removed and tested.	20-Oct-98	19-Oct-98	20-Oct-98

000153

GEOSYNTEC CONSULTANTS NONCONFORMANCE REPORT LOG

NCR Number	Date Discovered	Originator	Assessment	Responsible Organization/ Project	Description	Date Corrective Action Approved	Date of Verification of Corrective Action	Date NCR Closed
20102-013 ✱	8-Oct-98	K. Badu-Tweneboah	Construction QC Resident Eng. &	Petro Environmental Technologies	Construction of the access ramp within the OSDF Cell 1 area has proceeded with Cat. 2 material being placed over a woven geotextile deployed over previously placed and approved two lifts of Cat. 2 material. This is non-conformance with Section 8.3.1 of the IMPP requires an intervening lift of 4. ft. of Cat. 1 material.	8-Oct-98		
20102-014	31-Oct-98	Collin Sukow	Construction QC	GeoSyntec Consultants	There were no destructive samples marked on seams S-37/S-44, S-40/S-44, and S-40/S-45, which was 1 continous reconstructed seam mesasuring 157 ft. in length.	9-Nov-98	9-Nov-98	9-Nov-98
20102-015	31-Oct-98	Collin Sukow	Construction QC	GeoSyntec Consultants	Destructive sample D/S-17 failed lab testing. The seam was tracked and a "before" sample passed lab testing. the "after" sample failed field testing and the seam was reconstructed from the passing "before" sample location to the end of the seam. The next seam that machine (no. 9860) welded should have had a destructive sample located within the first 10 ft. of the seam and reconstructed to the beginning o the seam. D/S-27 was marked 164ft. into the seam and was not reconstructed to the beginning of the seam.	9-Nov-98	9-Nov-98	9-Nov-98
								2064

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JCG



GeoSyntec Consultants

CONSTRUCTION NONCONFORMANCE REPORT

1. ORIGINATOR: Daniel Bodine	2. TITLE/ORGANIZATION: Managing Engineer/GeoSyntec	3. NCR NUMBER: 20102-001	4. DATE DISCOVERED: 6 August 1998
5. RESPONSIBLE ORGANIZATION/PROJECT: GeoSyntec Consultants/OSDF Phase II		6. ASSESSMENT ACTIVITY: Construction Quality Control	7. HOLD TAG: () YES () NO
			8. REMOVED (Initial/Date):
9. REQUIREMENTS (Identify requirement from document [e.g., CQA plan, specification, drawing, etc.]): Part 3.06.C, Section 02225 states: "If the CQC Consultant's tests indicate that any portion of the compacted clay liner and cap does not meet the requirements of this section, the CQC Consultant will delineate the extent of the nonconforming area. Rework the nonconforming area until acceptable test results are obtained by the CQC Consultant."			
10. NONCONFORMANCE TYPE: Construction Nonconformance (X) Material Deviation ()			
11. NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required): On the Field Nuclear Moisture/Density Test Log dated 18 July 1998 for Compacted Clay Liner, Test No. 2-48 had a moisture content and dry unit weight that did not fall within the acceptable permeability zone (APZ). Therefore, this test should have been a failed test and a retest should have been conducted in accordance with the specifications. Also, the location of Test No. 2-49 is not shown on Sheet 4 of 4 of the Test Log.			
12. ORIGINATOR'S SIGNATURE: <i>Daniel Bodine</i>		13. DATE PROVIDED TO RESPONSIBLE MANAGER: 7 August 1998	
14. RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION: Use As-Is () Reject () Other (x) Repair () Rework () Test No. 2-48 was conducted near the toe of the cell slope and was considered a failed test as shown on Sheet 3 of 4 where it is outside the APZ. It was however incorrectly recorded as a passed test. Test No. 2-49 was a retest, and should have been correctly recorded on the Test Log. The typographic errors have been corrected, and the location of Test 2-49 is shown on Sheet 4 of 4 of Test Log.			
15. RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION): Collin Sukow, CQC Site Manager, GeoSyntec			
16. RESPONSIBLE MANAGER'S SIGNATURE: <i>Collin Sukow</i>		17. PROPOSED COMPLETION DATE: 11 August 1998	18. DATE FORWARDED TO APPROVAL AUTHORITY: 11 Aug. 1998

000155



GeoSyntec Consultants

2064

Page 2 of 2

CONSTRUCTION NONCONFORMANCE REPORT

19. EVALUATION OF PROPOSED CORRECTIVE ACTION:

Accept ☒

Reject ()

Comments ()

20. APPROVAL AUTHORITY SIGNATURE:

21. DATE:

*Ramul Bodine**11 August*

22. VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):

OSDF ENGINEERING CONCUR WITH CORRECTIVE ACTION PROVIDED
IN BLOCK NO. 14 OF THIS FORM. CORRECTION VERIFIED.

23. VERIFIER'S SIGNATURE:

24. DATE:

*Yunus Afshar for Jim Jenkins**9/2/98*

25. APPROVAL AUTHORITY SIGNATURE:

26. DATE CLOSED:

*Ramul Bodine**9/11/98*

27. CONTINUATION FROM BLOCK _____

000156



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04

DESCRIPTION: Phase II

DATE: 18 day July month 1998 year

SPECIFICATION REQUIREMENTS

SOURCE: Stockpile 98-1 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY / OTHER: _____ LIFT THICKNESS (LOOSE / COMPACTED): 10"

% COMPACTION: 95%; AP2 MOISTURE RANGE: +0% to +3%; AP2 ASTM D 698: A B C / ASTM D 1557: A B C

NUCLEAR GAUGE TYPE: Troxler NUCLEAR GAUGE SERIAL NO. 27418 COR. FACTOR: +2% QA ID: CS/8P

TEST NO.	TEST LOCATION	PROBE DEPTH / LIFT NO.	LAB RESULTS			FIELD TEST RESULTS					RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS / FAIL		PASS	FAIL
2-41	See location Map	8"/1	*	13.8	119.3	14.2	129.2	113.1	94.8	F	2-43	F	F
-42						15.4	137.1	118.8	100	P			
-43						14.1	131.3	115.1	96	F	2-56	F	F
-44						15.4	134.3	116.4	98	P			
-45						14.9	138.0	120.0	100+	P			
-46						13.8	136.9	120.3	100+	P			
-47						14.4	135.5	118.4	99.3	P			
-48						14.3	134.2	117.4	98	F	2-49	P	
-49						15.6	135.3	117.0	98	P			
-50		8"/1		13.8	119.3	14.9	132.7	115.5	96.8	F	2-53	P	

COMMENTS: * Ave. Proctor Value from LPII-1 thru LPII-5

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CONSTRUCTION NONCONFORMANCE REPORT

¹ ORIGINATOR: Daniel Bodine	² TITLE/ORGANIZATION: Managing Engineer/GeoSyntec	³ NCR NUMBER: 20102-002	⁴ DATE DISCOVERED 6 August 1998
⁵ RESPONSIBLE ORGANIZATION/PROJECT: GeoSyntec Consultants/OSDF Phase II		⁶ ASSESSMENT ACTIVITY: Construction Quality Control	⁷ HOLD TAG: () YES () NO
			⁸ REMOVED (Initial/Date):
⁹ REQUIREMENTS (Identify requirement from document [e.g., CQA plan, specification, drawing, etc.]): Part 3.03.A, Section 02225 requires the moisture content and dry density of clay liner and cap material placed to be within the acceptable permeability zone (APZ), which is based on three criteria including "... (ii) moisture content not greater than 3 percentage points wet of the standard Proctor optimum moisture content (ASTM D 698)".			
¹⁰ NONCONFORMANCE TYPE: Construction Nonconformance (<input checked="" type="checkbox"/>) Material Deviation ()			
¹¹ NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required): On the Field Nuclear Moisture/Density Test Log dated 30 July 1998 for Compacted Clay Liner, Test Nos. 2-93 and 2-94 moisture contents were more than the limit of 3 percentage points wet of the standard Proctor optimum moisture content, thereby falling outside the APZ. These tests should have been declared as failed tests, and re-tests should have been conducted in accordance with the specifications.			
¹² ORIGINATOR'S SIGNATURE: <i>Daniel Bodine</i>		¹³ DATE PROVIDED TO RESPONSIBLE MANAGER: 7 August 1998	
¹⁴ RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION: Use As-Is (<input checked="" type="checkbox"/>) Reject () Other (<input checked="" type="checkbox"/>) Repair () Rework () Test Nos. 2-93 and 2-94 had a field-measured moisture content (FMC) of 16.8%. The representative stockpile standard Proctor optimum moisture content used for the APZ was obtained by averaging the results from two tests (at the time of testing) on stockpile 98-3, resulting in a value of 13.3%. The FMC also included a 2% moisture correction, based on Phase I test data, from nuclear gauge to oven moisture content. The areas where the field tests were conducted were closely monitored by GeoSyntec CQC and found to be well compacted and that the compactor could traffic through the compacted lift without any significant indentations (or ruts). Since these two tests met the other criteria of the APZ, and visual observation indicated good compaction, GeoSyntec CQC considered them as acceptable and passing tests. Use as-is.			
¹⁵ RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION): Collin Sukow, CQC Site Manager, GeoSyntec			
¹⁶ RESPONSIBLE MANAGER'S SIGNATURE: <i>Collin Sukow</i>		¹⁷ PROPOSED COMPLETION DATE: 11 Aug. 1998	¹⁸ DATE FORWARDED TO APPROVAL AUTHORITY: 11 Aug. 1998

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98.08.11



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CONSTRUCTION NONCONFORMANCE REPORT

19. EVALUATION OF PROPOSED CORRECTIVE ACTION: Accept (x) Reject () Comments (x)

For all future occurrences obtain moisture sample for oven drying before passing test.

20. APPROVAL AUTHORITY SIGNATURE:

Daniel Boland

21. DATE:

11 Aug 98

22. VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):

Per the 8th AM meeting of 9/2/98 held with OSD Engineering, QA and Geosyntec, Geosyntec agreed to look at the moisture correction factor closely and evaluate the effect on the Field measured Moisture Content of 16.8% which is outlying the AP2 window by 0.5% - Provide Hydraulic Conductivity test result & provide answer to the following question - (Continue Block 27) ~~9/11/98~~

VERIFIER'S SIGNATURE:

John Benoit

24. DATE:

9-11-98

25. APPROVAL AUTHORITY SIGNATURE:

Daniel Boland

26. DATE CLOSED:

9-11-98

27. CONTINUATION FROM BLOCK 22:

- 1) What shear strengths have we found with similar moisture contents on soils with a similar proctor? How do these shear strengths affect slope stability?
 - 2) What is the % saturation for these samples? How would this saturation improve permeability? what would be the associated permeability?
- See attached additional information*
John Benoit 9-11-98

9/3/98
Y. AFSHAR

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RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Overview

This document has been prepared to address the request for additional information (RAI) by FDF Engineering on GeoSyntec's NCR Nos. 20102-002, 20102-004 and 20102-007. These NCRs relate to field-measured moisture contents (FMCs) of compacted clay liner material that exceeded the limit of 3 percentage points wet of standard Proctor optimum moisture content (OMC) per Part 3.03.A, Section 02225 of the Technical Specification. Since this issue affects several field test results, thereby requiring additional NCRs, GeoSyntec has prepared this response to collectively address all FMC values that exceed the limit of 3% above OMC.

The RAI by FDF Engineering is presented in Blocks 22 and 27 of NCR No. 20102-002. Each comment is reproduced verbatim in italics followed by GeoSyntec's response.

RAI No. 1

"...GeoSyntec agreed to look at the moisture correction factor closely and evaluate the effect on the Field Measured Moistor (sic) Content of 16.8% whic (sic) is outlying the APZ window by 0.5%..."

GeoSyntec's Response to RAI No.1

As explained in NCR No. 20102-002 – Block 14, Test Nos. 2-93 and 2-94 had a FMC of 16.8% which included a 2% moisture correction from nuclear gauge to oven moisture content, based on Phase I test data. During Phase I construction, it was found that this 2% moisture correction was representative of the range of moisture contents encountered. The data from Phase I construction has been re-plotted in the attached Figure 1. The best-fit linear regression line is also shown on Figure 1. Interpolation of Figure 1 with a nuclear gauge moisture content of 14.8% results in an oven moisture content of approximately 16.5%, which is not much different from the 16.8% previously used. This confirms that the use of a 2% moisture correction, at least for Phase I construction, is justifiable.

The up-to-date moisture correction data for Phase II construction is presented in Figure 2. Using the best-fit linear regression equation or line from Figure 2 gives an oven moisture content of 15.5% for Test Nos. 2-93 and 2-94. The representative stockpile standard Proctor OMC used for the APZ is 13.3% (average of two tests for stockpile 98-3). Thus the correct FMC value of 15.5 would result in 2.2% above the OMC, and thereby meet the APZ requirement. Therefore, both tests that were initially considered failed tests did indeed passed if the Phase II moisture correction data is used.

GeoSyntec has repeatedly explained that the areas where field tests slightly exceeded the 3% limit of OMC were always closely monitored by the CQC personnel and found to be well compacted with no traffickability problems from the compactor or dozer. This is because the representative stockpile OMC value used to evaluate field compaction is generally obtained from averaging two or more standard Proctor compaction tests. This average value neglects the variability in the measured values. An example is presented below for illustration purposes.

Stockpile 98-9 had three samples taken for laboratory testing. The OMC and MDD values from the three tests are (see NCR No. FY98-1556 Block 21): 17.3% and 112.7 pcf (Sample No. LPII-93); 13.8% and 116.7 pcf (Sample No. LPII-94); and 17.1% and 110.8 pcf (Sample No. LPII-97). The representative stockpile OMC and MDD values obtained by averaging the three tests are 16.1% and 113.4 pcf, respectively. Field compaction Test No. 2-279, for example, had a FMC = 18.9% which happened to meet the 3% limit of OMC with the value of 16.1%. GeoSyntec CQC took samples of the clay liner material from the test location, during the re-tests of 1 September 1998, and conducted a one-point compaction test. Test results (attached for Sample No. LPII-127) indicate a moisture content of 15.3% and dry density of 112.2 pcf. When compared with the three standard Proctor compaction test curves, this one-point test falls closely to the LPII-93 sample, which had an OMC of 17.3% (see attached results). This implies that field compaction Test No. LPII-279 could have had a FMC of 20.3% and passed the APZ criteria if only one sample test results was used. It is therefore evident that the averaging process, without accounting for the variability of test samples do indeed affect the evaluation of field compaction. Therefore, one should not solely rely on numbers to pass or fail field compaction tests. The clay soils for the OSDF project are no different from other naturally occurring clays, which have inherent and spatial variability. Geotechnical field experience should always be included in the decision making process.

RAI No. 2

"...Provide Hydraulic Conductivity test result..."

GeoSyntec's Response to RAI No. 2

Samples No. LPII-26 and LPII-36 from stockpile 98-3 used in the field Test Nos. 2-93 and 2-94 had laboratory-measured hydraulic conductivity values of 1.3×10^{-8} cm/s and 7.5×10^{-8} cm/s, respectively. These tests were conducted slightly below the limit of 3% above OMC. However, at higher moisture contents, hydraulic conductivity would definitely be lower than the above-reported values.

RAI No. 3

"... What shear strengths have we found with similar moisture contents on soils with a simillar (sic) proctor? How do these shear strengths affect slope stability?"

GeoSyntec's Response to RAI No. 3

The slope stability analyses of the OSDF are presented in the Final Design Calculation Package (GeoSyntec, 1996). In the analyses, shear strength parameters for the compacted clay liner were developed from tests performed on remolded samples of the on-site brown till material, which is being used for Phase II construction. The test data are presented in two reports prepared by Parson (1995, 1996). The conservative shear strength parameters used in the analyses are: $\phi_u = 0$ degrees; and $C_u = 500$ psf (for short-term (undrained) conditions); and $\phi_d = 25$ degrees, and $C_d = 0$ psf (for long-term (drained) conditions). These values were obtained by assuming that the compacted clay will be placed at 95 to 98 percent relative compaction (i.e., 0 to 3% above OMC).

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A review of the test data performed by Parsons indicate that some of the samples were remolded more than 3% above OMC. One sample, for example, with an OMC of 14.5% and remolded moisture content of 18.2 % had the following shear strength values: $\phi_u = 27$ degrees; and $C_u = 125$ psf (for short-term (undrained) conditions); and $\phi_d = 30$ degrees, and $C_d = 250$ psf (for long-term (drained) conditions). Even at 3.7% above OMC, the measured shear strength values definitely exceed the design values.

RAI No. 4

"...What is the % saturation for these samples? How would this saturation improve permeability? What would be the associated permeability?"

Response to RAI No.4

Test Nos. 2-93 and 2-94 had field measured dry density of 115.2 pcf and 114.9 pcf, respectively. The field-measured moisture content is 16.8%. Using a specific gravity of 2.72, which has been found from laboratory tests to be a representative value, the percent degree of saturation values are 96.5% and 95.8%, respectively, for Test Nos. 2-93 and 2-94. At degree of saturations greater than 95%, the compacted clay would have lower hydraulic conductivity. It should also be noted that the left boundary of the APZ is at a 90% degree of saturation.

GeoSyntec's Concluding Response

NCR Nos. 20102-002, 20102-004 and 20102-007 were written by GeoSyntec to document the moisture variance with respect to specification requirements. Our field and lab testing procedures involve averaging stockpile Proctor results, applying moisture corrections to the nuclear densometer moisture, obtaining additional oven dry moisture samples, and observing field placement and compaction conditions before evaluating the acceptability of the compacted lift. GeoSyntec evaluated the fill and considered the fill and field tests acceptable. Our recommendation and conclusion is use-as-is. For future use a design change notice is being prepared to address the upper moisture limit of 3% above OMC.

Kwasi Badu-Tweneboah, Ph.D., P.E.

Resident Engineer

Ohio Registration No. E-55354

Daniel Bodine 10 Sep/98

Daniel G. Bodine, P.E.

Managing/Certifying Engineer

Ohio Registration No. E-61363

000163

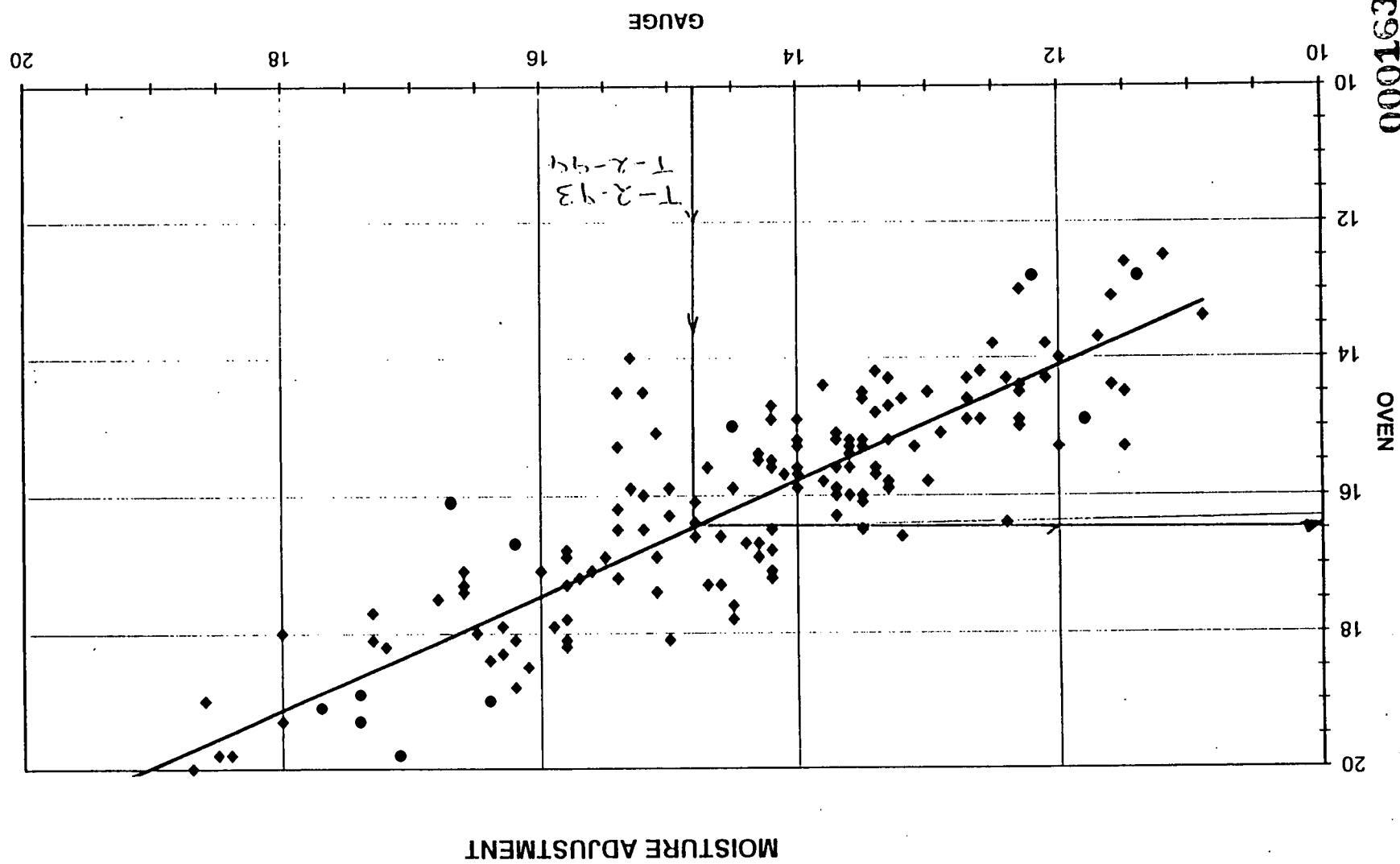
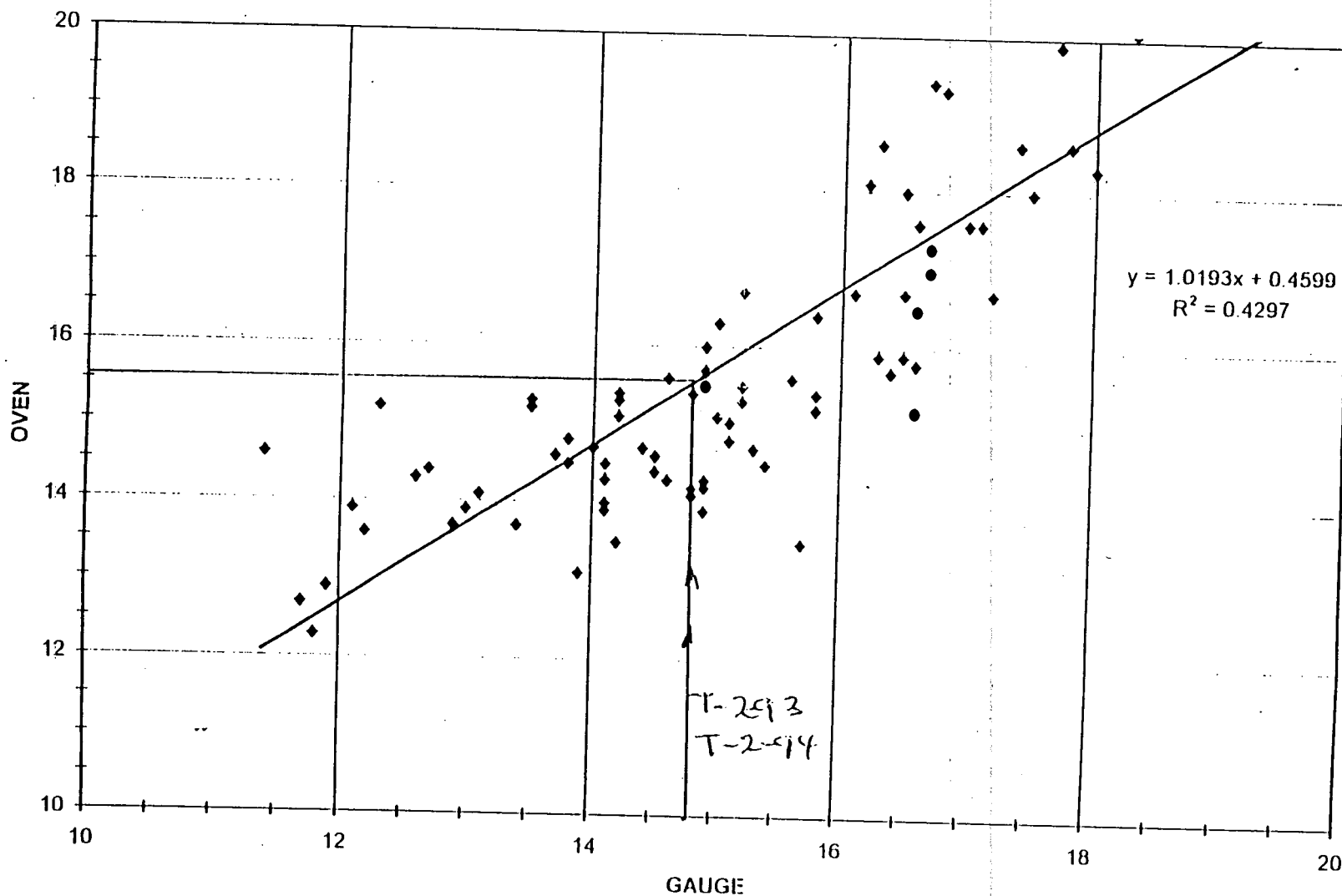


Figure 2. PHASE II DATA

Chart 3

MOISTURE ADJUSTMENT



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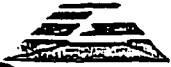


GeoSyntec Consultants

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CONSTRUCTION NONCONFORMANCE REPORT

ORIGINATOR: NED MEEKINS	TITLE/ORGANIZATION: SR. ENG. TECH GEOSYNTEC CONSULTANTS	NCR NUMBER: 20102-003	DATE DISCOVERED: 11 August 1998
RESPONSIBLE ORGANIZATION/PROJECT: PETRO ENVIRONMENTAL OSDF PHASE II		ASSESSMENT ACTIVITY: CONSTRUCTION QUALITY CONTROL	HOLD TAG: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO REMOVED (Initial/Date):
REQUIREMENTS (Identify requirement from document (e.g., CQA plan, specification, drawing, etc.)): OSDF PHASE II TECHNICAL SPECIFICATION SECTION 02225, PART 2.01C IDENTIFY SOURCES AND VOLUMES OF CLAY LINER AND CAP MATERIALS AT LEAST 15 CALENDAR DAYS PRIOR TO USE TO ALLOW FOR CONFORMANCE TESTING OF SOIL BY THE CQC CONSULTANT. . . .			
NONCONFORMANCE TYPE: Construction Nonconformance <input checked="" type="checkbox"/> Material Deviation ()			
NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required): SCREENED CLAY LINER SOILS WERE USED AS COMPACTED CLAY LINER, FROM STOCKPILE 98-5, BEFORE LABORATORY TESTING WAS COMPLETED.			
ORIGINATOR'S SIGNATURE: <i>[Signature]</i>		DATE PROVIDED TO RESPONSIBLE MANAGER: 11 August 1998	
RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION:		Use As-Is () Reject () Other () Repair () Rework ()	
DISCONTINUE USE OF STOCKPILE 98-5 MATERIAL UNTIL SUFFICIENT LABORATORY TESTING IS COMPLETE AND STOCKPILE IS APPROVED FOR USE. CONTINUED USE OF STOCKPILE IS AT CONTRACTORS RISK AS APPROVED BY FDF CONSTRUCTION MANAGER.			
RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION): Daniel Bodine Managing Engineer GeoSyntec			
RESPONSIBLE MANAGER'S SIGNATURE: <i>[Signature]</i> 11 Aug 98		PROPOSED COMPLETION DATE: 30 Aug 98	DATE FORWARDED TO APPROVAL AUTHORITY: 11 Aug 98



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CONSTRUCTION NONCONFORMANCE REPORT

EVALUATION OF PROPOSED CORRECTIVE ACTION:		Accept ()	Reject ()
Comments ()			
DISCONTINUE USE OF STOCKPILE 9B-5 MATERIAL AND EXPEDITE COMPLETION OF LABORATORY TESTING. VERIFY TEST RESULTS TO MEET SPEC REQUIREMENTS. IF THE TEST RESULTS DO NOT MEET SPEC REQUIREMENTS, THE MATERIAL SHALL BE REMOVED & REPLACED AND PAID FOR BY THE CONTRACTOR.			
APPROVAL AUTHORITY SIGNATURE:		DATE:	
Yunus G. Ishaq for Jim JENKINS		9/2/98	
VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):			
Data has been reviewed and verified with acceptable results.			
VERIFIER'S SIGNATURE:		DATE:	
John J. Berube		9-11-98	
APPROVAL AUTHORITY SIGNATURE:		DATE CLOSED:	
Daniel Bottino		9-11-98	
CONTINUATION FROM BLOCK _____			



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Page 1 of 1

CONSTRUCTION NONCONFORMANCE REPORT

1. ORIGINATOR: Collin P. Sukow	2. TITLE/ORGANIZATION: Site CQC Manager/GeoSyntec	3. NCR NUMBER: 20102-004	4. DATE DISCOVERED: 25 August 1998
5. RESPONSIBLE ORGANIZATION/PROJECT: GeoSyntec Consultants/OSDF Phase II		6. ASSESSMENT ACTIVITY: Construction Quality Control	7. HOLD TAG: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
			8. REMOVED (Initial Date):
9. REQUIREMENTS (Identify requirement from document (e.g., CQA plan, specification, drawing, etc.)): Part 3.03.A, Section 02225 requires the moisture content and dry density of clay liner and cap material placed to be within the acceptable permeability zone (APZ), which is based on three criteria including "... (ii) moisture content not greater than 3 percentage points wet of the standard Proctor optimum moisture content (ASTM D698)".			
10. NONCONFORMANCE TYPE: Construction Nonconformance <input checked="" type="checkbox"/> Material Deviation ()			
11. NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required): On the Field Nuclear Density/Moisture Test Log dated 25 August 1998 for compacted Clay liner, Test Nos 2-276 and 2-277 had field moisture contents greater than the limit of 3 percentage points wet of the standard Proctor optimum moisture content, thereby falling outside the APZ. These tests should have been declared as failed tests, and retests should have been conducted in accordance with the specifications.			
12. ORIGINATOR'S SIGNATURE: Collin P. Sukow		13. DATE PROVIDED TO RESPONSIBLE MANAGER: 28 August 1998	
14. RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION: Test Nos. 2-276 and 2-277 had field moisture contents of 19.4% and 19.5%, respectively. The representative stockpile standard proctor optimum moisture content used for the APZ was obtained by averaging the results from three tests on Stockpile 98-9, resulting in a value of 16.1%. The Field Moisture Contents also included a 1.2% moisture correction based on a linear regression curve calculated from nuclear density and oven moisture contents. The areas where the Field tests were conducted were closely monitored by GeoSyntec CQC and found to be well compacted with 96% and 97% of the maximum density. Since these two tests met the other criteria of the APZ, and Visual observation indicated good compaction, GeoSyntec CQC considers them as acceptable. Use as-is.			
15. RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION): Daniel Bodine Project Manager GeoSyntec			
16. RESPONSIBLE MANAGER'S SIGNATURE: Daniel Bodine		17. PROPOSED COMPLETION DATE: 28 Aug 1998	18. DATE FORWARDED TO APPROVAL AUTHORITY: 28 Aug 1998

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CONSTRUCTION NONCONFORMANCE REPORT

20102-004

EVALUATION OF PROPOSED CORRECTIVE ACTION:

Accept ()

Reject ()

Comments (X)

This NCR is similar to NCR NO. 20102-002. Please check the available data with similar moisture content on shear strength, % saturation, and permeability. If results are not satisfactory, contractor has scarify the area to dry & recompact and retest.

In the future moisture content must be kept within the limit specified in the specs.

APPROVAL AUTHORITY SIGNATURE:

DATE:

Yunus Afshar for JIM JENKINS

4/3/98

VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):

See Attached additional information. 9-11-98

VERIFIER'S SIGNATURE:

DATE:

Tommy Bennett

9-11-98

APPROVAL AUTHORITY SIGNATURE:

DATE CLOSED:

Daniel Bortone

9-11-98

CONTINUATION FROM BLOCK _____

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GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04

DESCRIPTION: Phase I/II Constr.

DATE: 25 day Aug month 1998 year

SPECIFICATION REQUIREMENTS

SOURCE: onsite stockpile MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY / OTHER: _____ LIFT THICKNESS (LOOSE / COMPACTED): 6"
(CIRCLE ONE)

% COMPACTION: >95% MOISTURE RANGE: 0 to 13% / APZ ASTM D 698: A B C / ASTM D 1557: A B C
(CIRCLE ONE) refer to 2516.98

NUCLEAR GAUGE TYPE: Troyer 3430 NUCLEAR GAUGE SERIAL NO. _____ COR. FACTOR: moisture density correction QA ID: _____

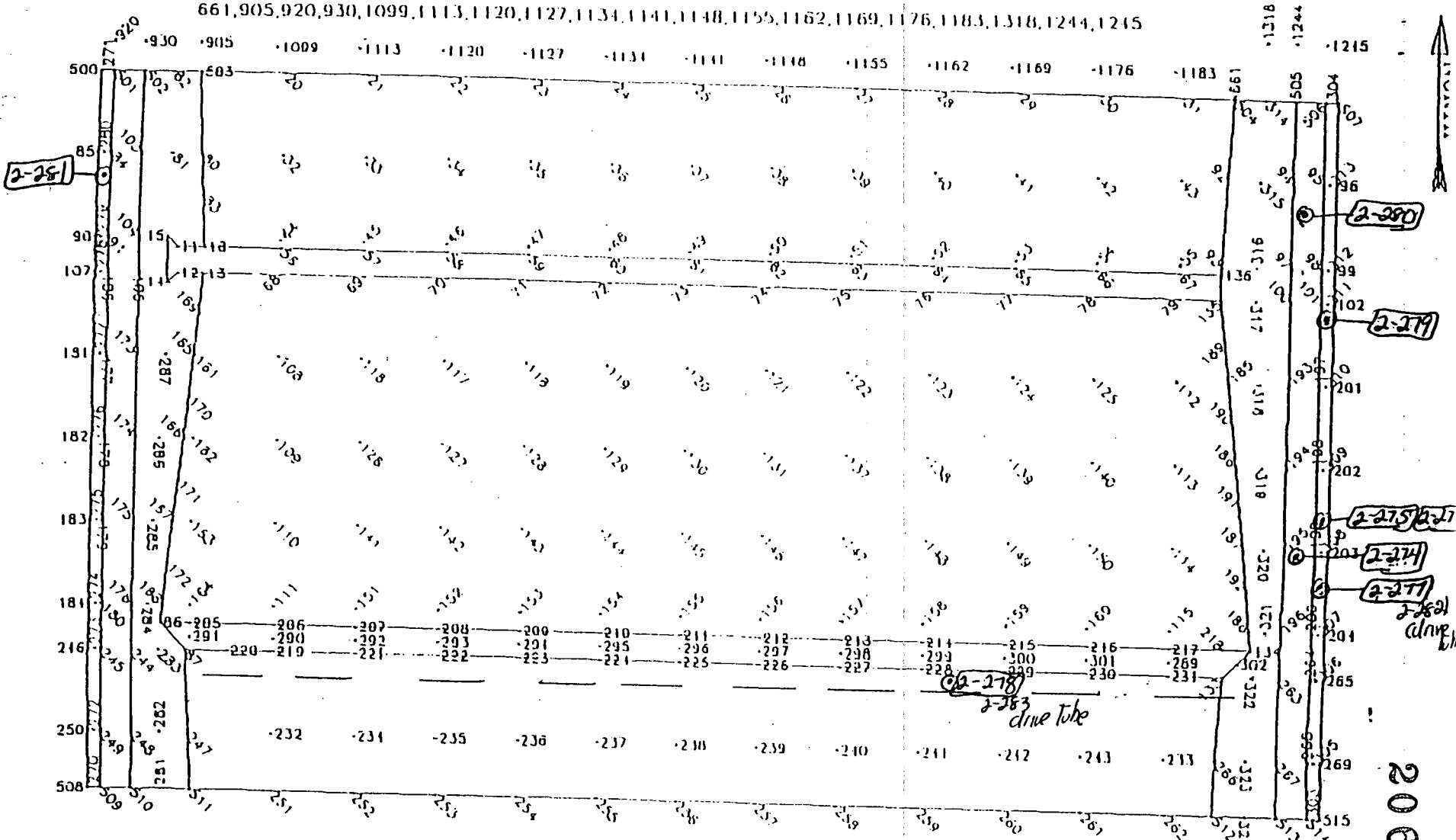
TEST NO.	TEST LOCATION	PROBE DEPTH / LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
2-274	see cell 2 sketch ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	6"/2	98-9	16.1	111.9	17.6	131.9	112.2	100.2	P				
2-275						17.6	130.0	110.5	98.8		F	2-276	P	
2-276						19.4	129.4	108.4	96.9	P				
2-277						19.5	128.3	107.4	96.0	P				
2-278		6"/9				17.6	131.8	112.1	100.2	P				
2-279		6"/2				18.9	127.4	107.1	95.7		F	2-284	P	
2-280						18.1	130.1	110.2	98.5	P				
2-281		6"/1	98-3	13.2	120.0	17.6	128.1	108.9	90.8		F	2-286		
2-282														
2-283														

COMMENTS: 2-282, 2-283 were both drive tube tests

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EXISTING CELL 1 CERTIFICATION POINTS

661,905,920,930,1099,1113,1120,1127,1134,1141,1148,1155,1162,1169,1176,1183,1318,1244,1245



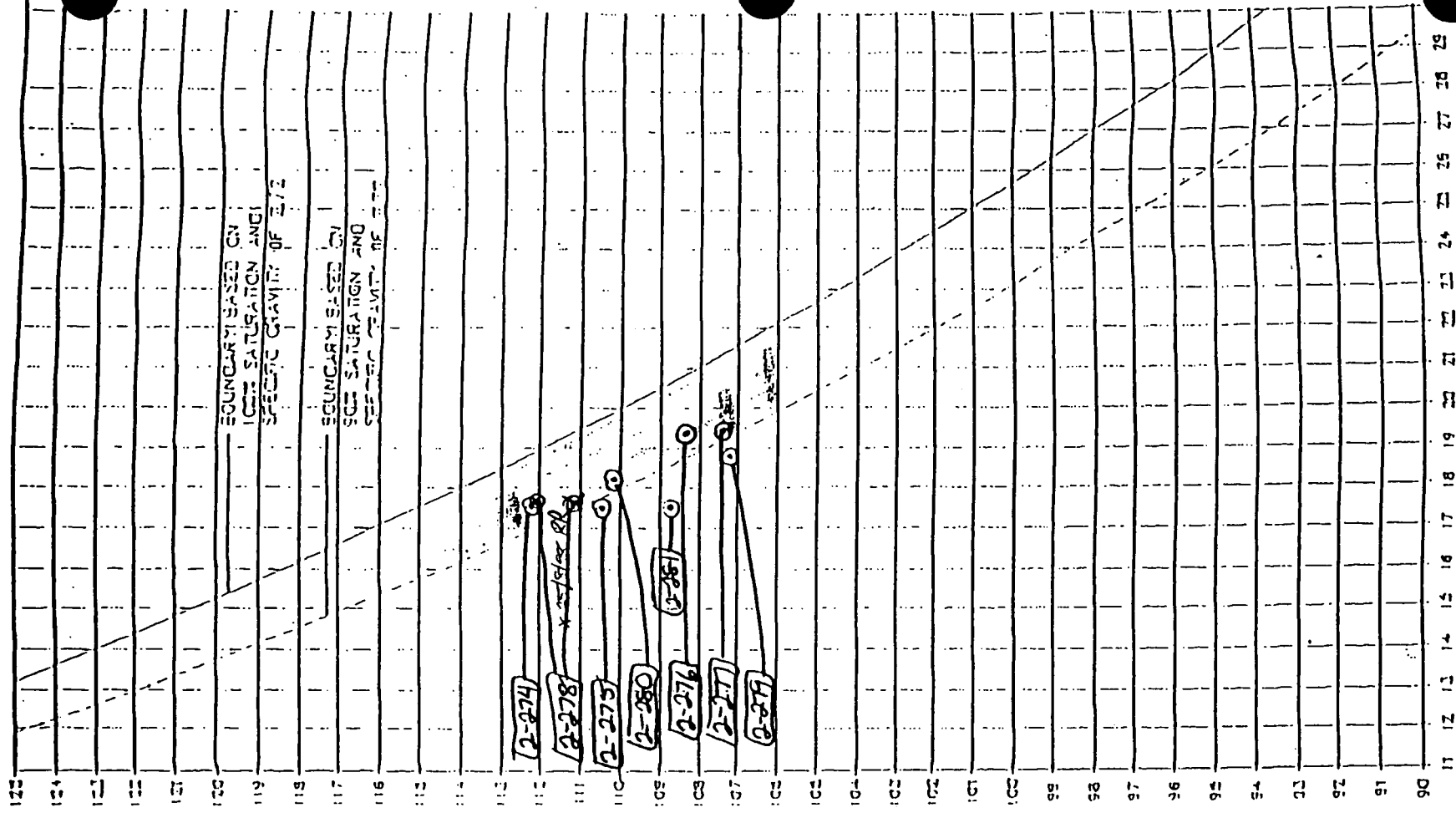
CELL 2

GQ0409-04.1

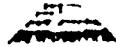
25 Aug 1998

SHEET 1 of 35

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(10) DRY UNIT WEIGHT (pcf)

 GEO SYNTHETIC CONSULTANTS, INC. ATLANTA, GA	
PROJECT NO. 690109-0.1	FIGURE NO. 1
OCCUPANT NO.	FILE NO. 19711001

25 Aug 1998
 sheet 3 of 35

MOISTURE CONTENT (%)

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TOTAL P. 82

10	9.5934
10.1	9.71328
10.2	9.83316
10.3	9.95304
10.4	10.07292
10.5	10.1928
10.6	10.31268
10.7	10.43256
10.8	10.55244
10.9	10.67232
11	10.7922
11.1	10.91208
11.2	11.03196
11.3	11.15184
11.4	11.27172
11.5	11.3916
11.6	11.51148
11.7	11.63136
11.8	11.75124
11.9	11.87112
12	11.991
12.1	12.11088
12.2	12.23076
12.3	12.35064
12.4	12.47052
12.5	12.5904
12.6	12.71028
12.7	12.83016
12.8	12.95004
12.9	13.06992
13	13.1898
13.1	13.30968
13.2	13.42956
13.3	13.54944
13.4	13.66932
13.5	13.7892
13.6	13.90908
13.7	14.02896
13.8	14.14884
13.9	14.26872
14	14.3886
14.1	14.50848
14.2	14.62836
14.3	14.74824
14.4	14.86812
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14.7	15.22776
14.8	15.34764
14.9	15.46752

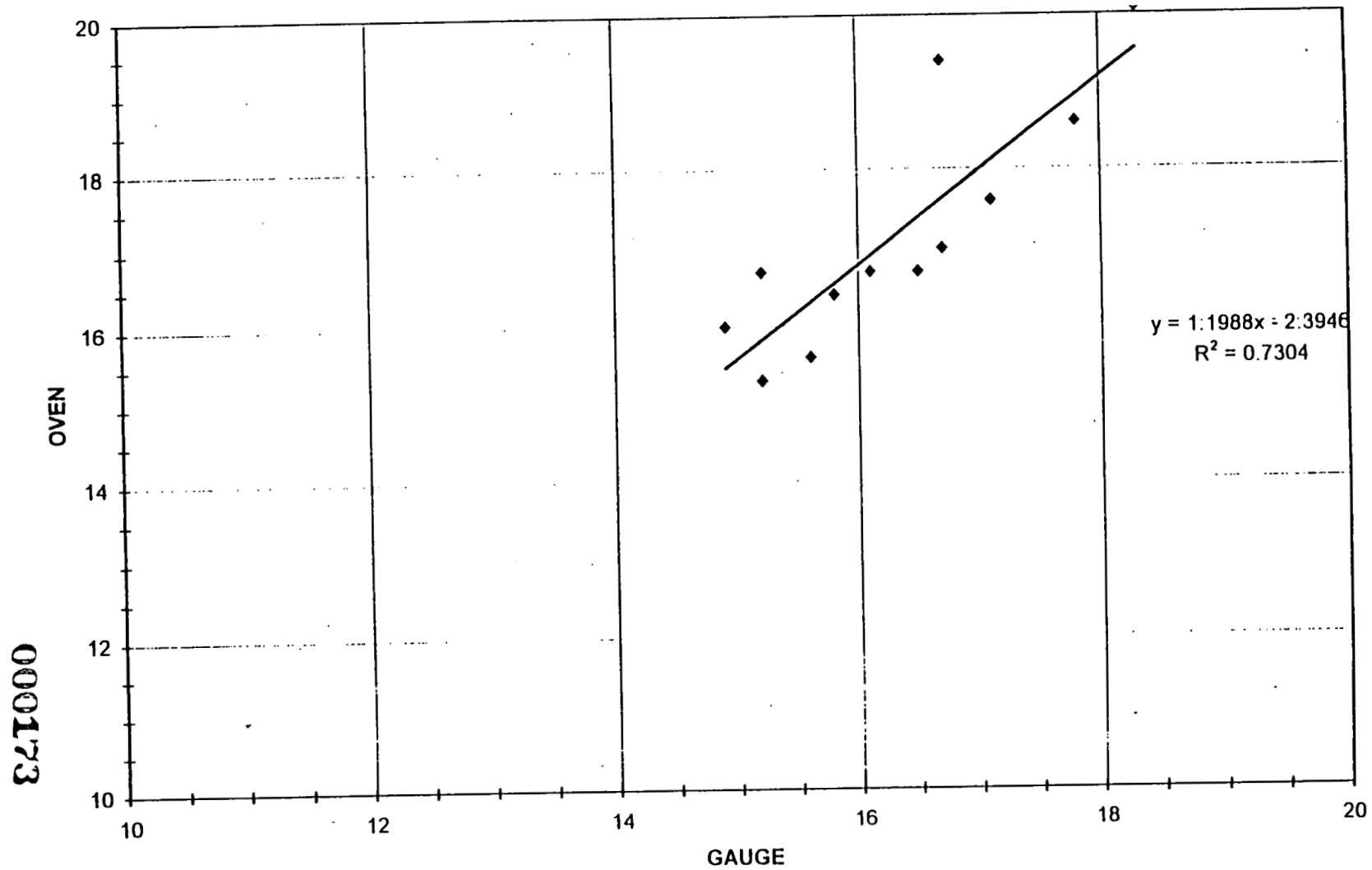
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15.1	15.70728
15.2	15.82716
15.3	15.94704
15.4	16.06692
15.5	16.1868
15.6	16.30668
15.7	16.42656
15.8	16.54644
15.9	16.66632
16	16.7862
16.1	16.90608
16.2	17.02596
16.3	17.14584
16.4	17.26572
16.5	17.3856
16.6	17.50548
16.7	17.62536
16.8	17.74524
16.9	17.86512
17	17.985
17.1	18.10488
17.2	18.22476
17.3	18.34464
17.4	18.46452
17.5	18.5844
17.6	18.70428
17.7	18.82416
17.8	18.94404
17.9	19.06392
18	19.1838
18.1	19.30368
18.2	19.42356
18.3	19.54344
18.4	19.66332
18.5	19.7832
18.6	19.90308
18.7	20.02296
18.8	20.14284
18.9	20.26272
19	20.3826

25 Aug
1998

15

Chart3

MOISTURE ADJUSTMENT



25 Aug 1998

S.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Overview

This document has been prepared to address the request for additional information (RAI) by FDF Engineering on GeoSyntec's NCR Nos. 20102-002, 20102-004 and 20102-007. These NCRs relate to field-measured moisture contents (FMCs) of compacted clay liner material that exceeded the limit of 3 percentage points wet of standard Proctor optimum moisture content (OMC) per Part 3.03.A, Section 02225 of the Technical Specification. Since this issue affects several field test results, thereby requiring additional NCRs, GeoSyntec has prepared this response to collectively address all FMC values that exceed the limit of 3% above OMC.

The RAI by FDF Engineering is presented in Blocks 22 and 27 of NCR No. 20102-002. Each comment is reproduced verbatim in italics followed by GeoSyntec's response.

RAI No. 1

"...GeoSyntec agreed to look at the moisture correction factor closely and evaluate the effect on the Field Measured Moistor (sic) Content of 16.8% whic (sic) is outlying the APZ window by 0.5%..."

GeoSyntec's Response to RAI No.1

As explained in NCR No. 20102-002 - Block 14, Test Nos. 2-93 and 2-94 had a FMC of 16.8% which included a 2% moisture correction from nuclear gauge to oven moisture content, based on Phase I test data. During Phase I construction, it was found that this 2% moisture correction was representative of the range of moisture contents encountered. The data from Phase I construction has been re-plotted in the attached Figure 1. The best-fit linear regression line is also shown on Figure 1. Interpolation of Figure 1 with a nuclear gauge moisture content of 14.8% results in an oven moisture content of approximately 16.5%, which is not much different from the 16.8% previously used. This confirms that the use of a 2% moisture correction, at least for Phase I construction, is justifiable.

The up-to-date moisture correction data for Phase II construction is presented in Figure 2. Using the best-fit linear regression equation or line from Figure 2 gives an oven moisture content of 15.5% for Test Nos. 2-93 and 2-94. The representative stockpile standard Proctor OMC used for the APZ is 13.3% (average of two tests for stockpile 98-3). Thus the correct FMC value of 15.5 would result in 2.2% above the OMC, and thereby meet the APZ requirement. Therefore, both tests that were initially considered failed tests did indeed passed if the Phase II moisture correction data is used.

GeoSyntec has repeatedly explained that the areas where field tests slightly exceeded the 3% limit of OMC were always closely monitored by the CQC personnel and found to be well compacted with no traffickability problems from the compactor or dozer. This is because the representative stockpile OMC value used to evaluate field compaction is generally obtained from averaging two or more standard Proctor compaction tests. This average value neglects the variability in the measured values. An example is presented below for illustration purposes.

Stockpile 98-9 had three samples taken for laboratory testing. The OMC and MDD values from the three tests are (see NCR No. FY98-1556 Block 21): 17.3% and 112.7 pcf (Sample No. LPII-93); 13.8% and 116.7 pcf (Sample No. LPII-94); and 17.1% and 110.8 pcf (Sample No. LPII-97). The representative stockpile OMC and MDD values obtained by averaging the three tests are 16.1% and 113.4 pcf, respectively. Field compaction Test No. 2-279, for example, had a FMC = 18.9% which happened to meet the 3% limit of OMC with the value of 16.1%. GeoSyntec CQC took samples of the clay liner material from the test location, during the re-tests of 1 September 1998, and conducted a one-point compaction test. Test results (attached for Sample No. LPII-127) indicate a moisture content of 15.3% and dry density of 112.2 pcf. When compared with the three standard Proctor compaction test curves, this one-point test falls closely to the LPII-93 sample, which had an OMC of 17.3% (see attached results). This implies that field compaction Test No. LPII-279 could have had a FMC of 20.3% and passed the APZ criteria if only one sample test results was used. It is therefore evident that the averaging process, without accounting for the variability of test samples do indeed affect the evaluation of field compaction. Therefore, one should not solely rely on numbers to pass or fail field compaction tests. The clay soils for the OSDF project are no different from other naturally occurring clays, which have inherent and spatial variability. Geotechnical field experience should always be included in the decision making process.

RAI No. 2

"...Provide Hydraulic Conductivity test result..."

GeoSyntec's Response to RAI No. 2

Samples No. LPII-26 and LPII-36 from stockpile 98-3 used in the field Test Nos. 2-93 and 2-94 had laboratory-measured hydraulic conductivity values of 1.3×10^{-8} cm/s and 7.5×10^{-8} cm/s, respectively. These tests were conducted slightly below the limit of 3% above OMC. However, at higher moisture contents, hydraulic conductivity would definitely be lower than the above-reported values.

RAI No. 3

"... What shear strengths have we found with similar moisture contents on soils with a similar (sic) proctor? How do these shear strengths affect slope stability?"

GeoSyntec's Response to RAI No. 3

The slope stability analyses of the OSDF are presented in the Final Design Calculation Package (GeoSyntec, 1996). In the analyses, shear strength parameters for the compacted clay liner were developed from tests performed on remolded samples of the on-site brown till material, which is being used for Phase II construction. The test data are presented in two reports prepared by Parson (1995, 1996). The conservative shear strength parameters used in the analyses are: $\phi_u = 0$ degrees; and $C_u = 500$ psf (for short-term (undrained) conditions); and $\phi_d = 25$ degrees, and $C_d = 0$ psf (for long-term (drained) conditions). These values were obtained by assuming that the compacted clay will be placed at 95 to 98 percent relative compaction (i.e., 0 to 3% above OMC).

A review of the test data performed by Parsons indicate that some of the samples were remolded more than 3% above OMC. One sample, for example, with an OMC of 14.5% and remolded moisture content of 18.2 % had the following shear strength values: $\phi_u = 27$ degrees; and $C_u = 125$ psf (for short-term (undrained) conditions); and $\phi_d = 30$ degrees, and $C_d = 250$ psf (for long-term (drained) conditions). Even at 3.7% above OMC, the measured shear strength values definitely exceed the design values.

RAI No. 4

"...What is the % saturation for these samples? How would this saturation improve permeability? What would be the associated permeability?"

Response to RAI No.4

Test Nos. 2-93 and 2-94 had field measured dry density of 115.2 pcf and 114.9 pcf, respectively. The field-measured moisture content is 16.8%. Using a specific gravity of 2.72, which has been found from laboratory tests to be a representative value, the percent degree of saturation values are 96.5% and 95.8%, respectively, for Test Nos. 2-93 and 2-94. At degree of saturations greater than 95%, the compacted clay would have lower hydraulic conductivity. It should also be noted that the left boundary of the APZ is at a 90% degree of saturation.

GeoSyntec's Concluding Response

NCR Nos. 20102-002, 20102-004 and 20102-007 were written by GeoSyntec to document the moisture variance with respect to specification requirements. Our field and lab testing procedures involve averaging stockpile Proctor results, applying moisture corrections to the nuclear densometer moisture, obtaining additional oven dry moisture samples, and observing field placement and compaction conditions before evaluating the acceptability of the compacted lift. GeoSyntec evaluated the fill and considered the fill and field tests acceptable. Our recommendation and conclusion is use-as-is. For future use a design change notice is being prepared to address the upper moisture limit of 3% above OMC.

Kwasi Badu-Tweneboah, Ph.D., P.E.

Resident Engineer

Ohio Registration No. E-55354

Daniel Bodine 10 Sep/98

Daniel G. Bodine, P.E.

Managing/Certifying Engineer

Ohio Registration No. E-61363

Figure 1. PHASE I DATA

MOISTURE ADJUSTMENT

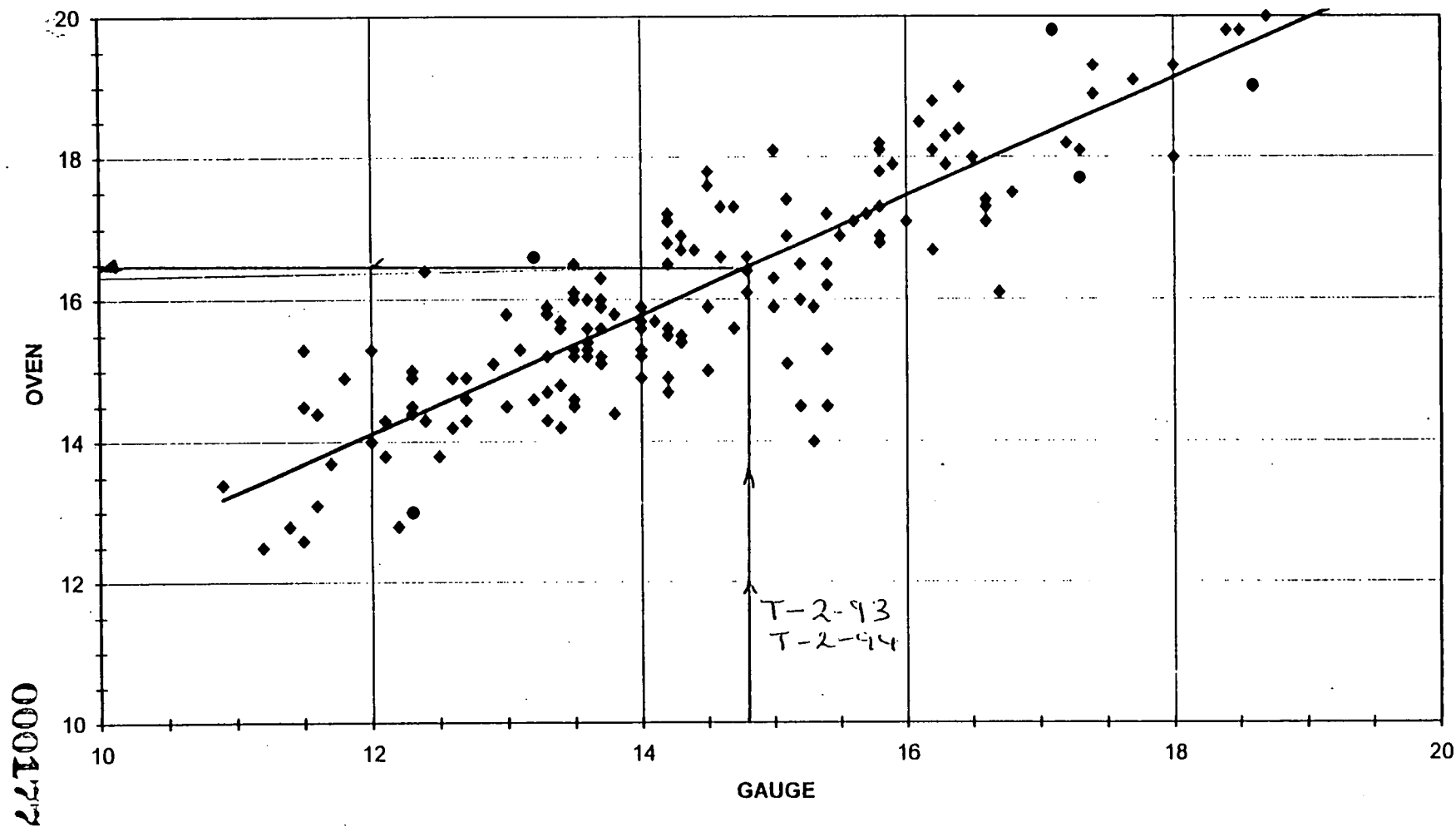
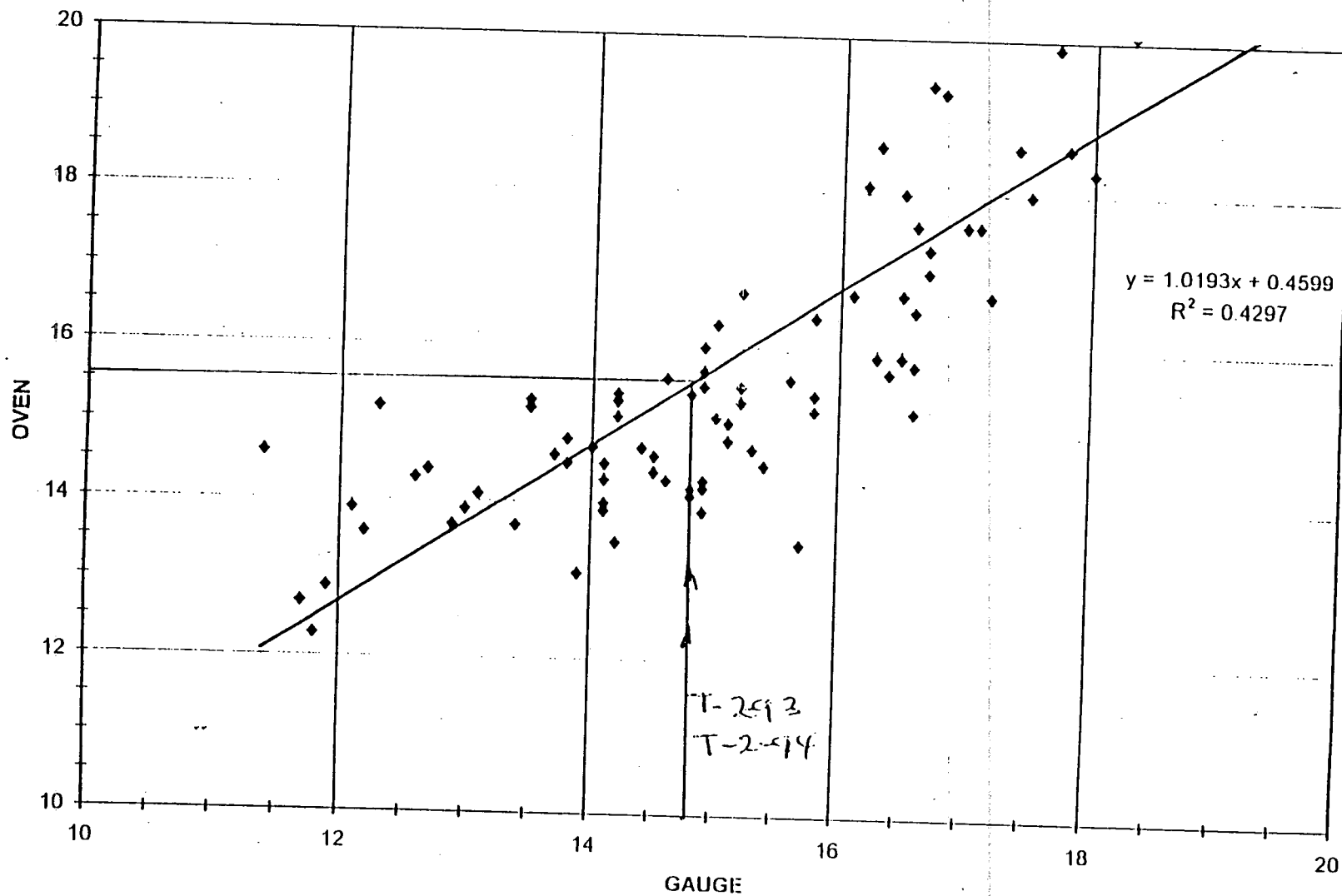


Figure 2. PHASE II DATA

Chart3

MOISTURE ADJUSTMENT



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GeoSyntec Consultants

Page 1 of 1

CONSTRUCTION NONCONFORMANCE REPORT

1. ORIGINATOR: <i>Collin P. Sukow</i>	2. TITLE/ORGANIZATION: <i>Site CQC Manager/GeoSyntec</i>	3. NCR NUMBER: <i>20102-005</i>	4. DATE DISCOVERED: <i>28 August 1998</i>
5. RESPONSIBLE ORGANIZATION/PROJECT: <i>GeoSyntec Consultants/OSDF Phase II Petro Environmental</i>		6. ASSESSMENT ACTIVITY: <i>Construction Quality Control</i>	7. HOLD TAG: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO 8. REMOVED (Initial Date):
9. REQUIREMENTS (Identify requirement from document (e.g., CQA plan, specification, drawing, etc.): <i>OSDF PHASE II TECHNICAL SPECIFICATION SECTION 0225, PART 2.01 C</i> <i>Identify sources and volumes of clay liner and cap materials at least 15 Calendar days prior to use to allow for conformance testing of soil by the CQC consultant....</i>			
10. NONCONFORMANCE TYPE: <input checked="" type="checkbox"/> Construction Nonconformance <input type="checkbox"/> Material Deviation			
11. NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required): <i>Screened clay liner soils were used as compacted clay liner from Stockpile 98-10 before laboratory testing was completed.</i>			
12. ORIGINATOR'S SIGNATURE: <i>Collin P. Sukow</i>		13. DATE PROVIDED TO RESPONSIBLE MANAGER: <i>28 August 1998</i>	
14. RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION: <i>Continued use of Stockpile 98-10 is at contractors own risk as approved by FDF construction Manager. Final review will be completed after receiving final CQC conformance laboratory test results</i>		15. Use As-Is () <input type="checkbox"/> Reject () <input type="checkbox"/> Other <input checked="" type="checkbox"/> Repair () <input type="checkbox"/> Rework () <input type="checkbox"/>	
16. RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION): <i>Daniel Bodino Project Manager GeoSyntec</i>			
17. RESPONSIBLE MANAGER'S SIGNATURE: <i>Daniel Bodino</i>		18. PROPOSED COMPLETION DATE: <i>2 Sept. 98</i>	19. DATE FORWARDED TO APPROVAL AUTHORITY: <i>28 Aug 1998</i>

000179



GeoSyntec Consultants

2064

Page 2 of 2

CONSTRUCTION NONCONFORMANCE REPORT

EVALUATION OF PROPOSED CORRECTIVE ACTION:

Comments ()

Accept ()

Reject ()

VERIFY Test results to meet spec. requirements; IF the test results do not meet spec. requirements, material shall be removed & replaced and paid for by the contractor.

APPROVAL AUTHORITY SIGNATURE:

John Beres For Jim Jenkins

DATE:

9-11-98

VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):

Data has been reviewed and verified with acceptable results.

SEE ATTACHED RESULTS FOR LPII-106, & LPII-99

VERIFIER'S SIGNATURE:

John Beres

DATE:

9-11-98

APPROVAL AUTHORITY SIGNATURE:

David Bohlen

DATE CLOSED:

9-11-98

CONTINUATION FROM BLOCK _____

000180

NCR 20/02-005



GEOSYNTEC CONSULTANTS

Geomechanics and Environmental
Laboratory

Sample ID: LP-II-117

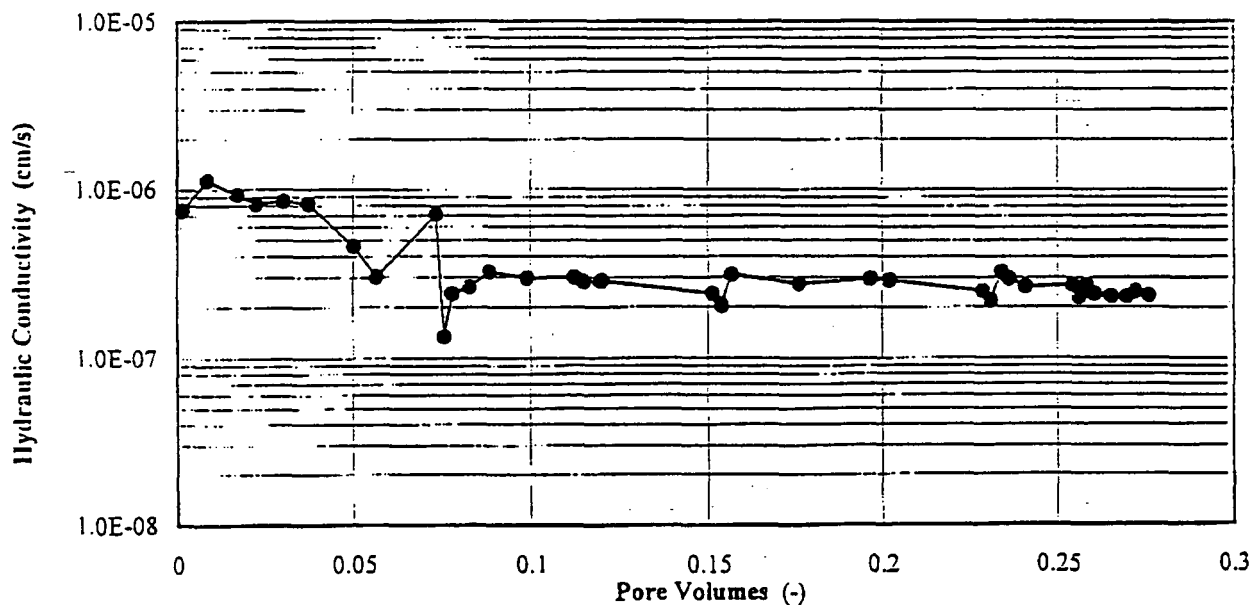
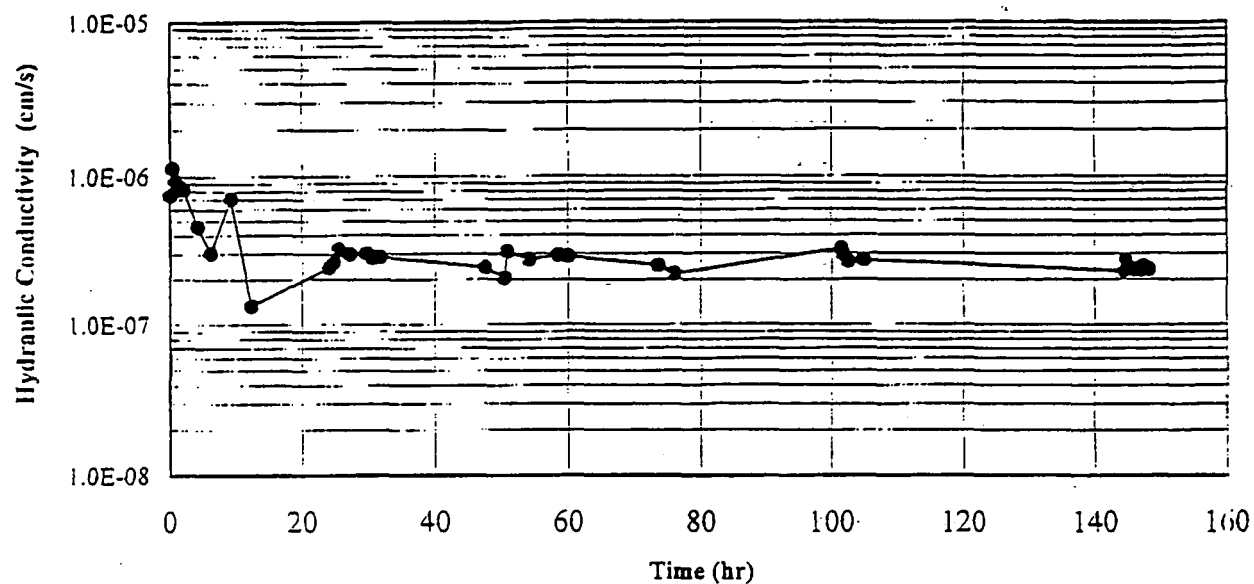
Project Name: OSDF - Phase II

Project No.: GQ0409

ASTM D 5084

HYDRAULIC CONDUCTIVITY TESTING

Figure



Sample ID	Lab Sample No.	Specimen Initial Condition		Consolidation Pressure, σ_c (psi)	Hydraulic Conductivity, k (cm/s)
		Dry Unit Weight (pcf)	Moisture Content (%)		
LP-II-117	98H308	112.4	17.7	5	2.4E-7

Note(s):

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GEO SYNTec CONSULTANTS

Geomechanics and Environmental
Laboratory

Sample ID: LP-II-117

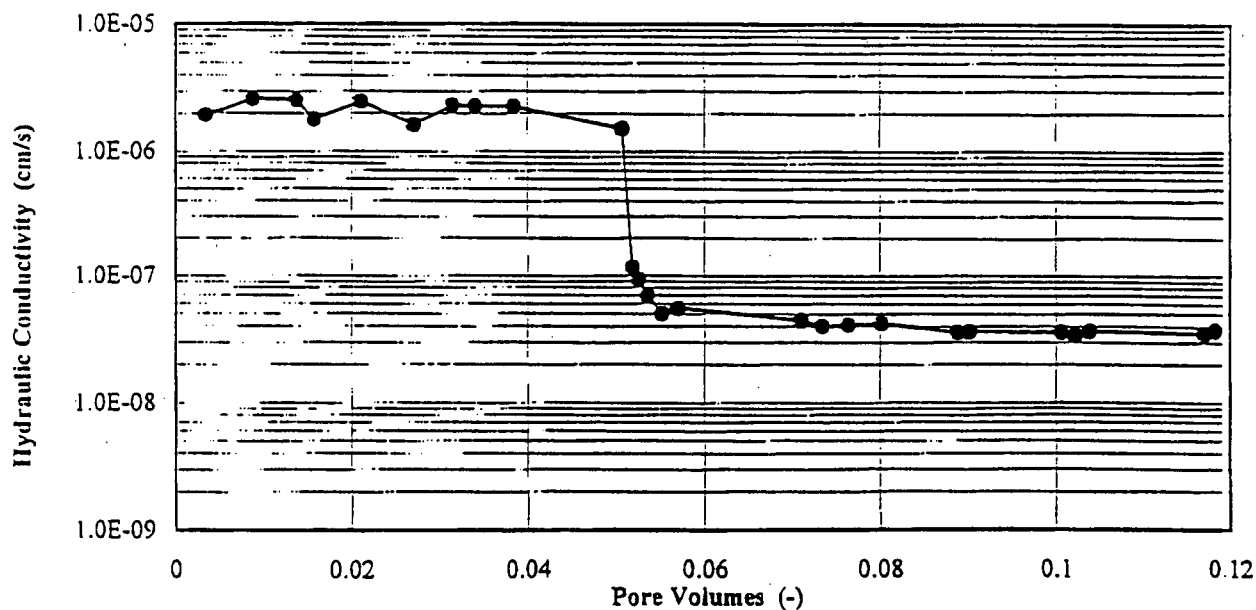
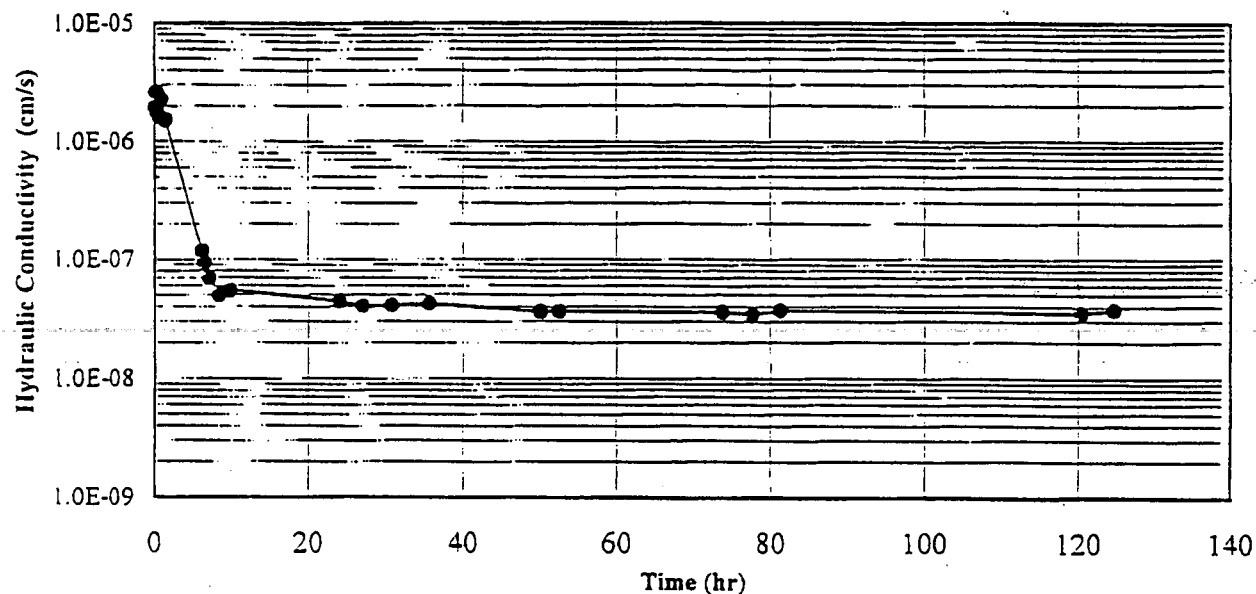
Project Name: OSDF - Phase II

Project No.: GQ0409

ASTM D 5084

HYDRAULIC CONDUCTIVITY TESTING

Figure



Sample ID	Lab Sample No.	Specimen Initial Condition		Consolidation Pressure, σ_c (psi)	Hydraulic Conductivity, k (cm/s)
		Dry Unit Weight (pcf)	Moisture Content (%)		
LP-II-117	98H308.2	115.6	16.7	5	3.6E-8

Note(s): Permeability decreased after "honeycombed" sides were smoothed out.

000182



GEOSYNTEC CONSULTANTS

Geomechanics and Environmental
Laboratory

Sample ID: LP-II-117

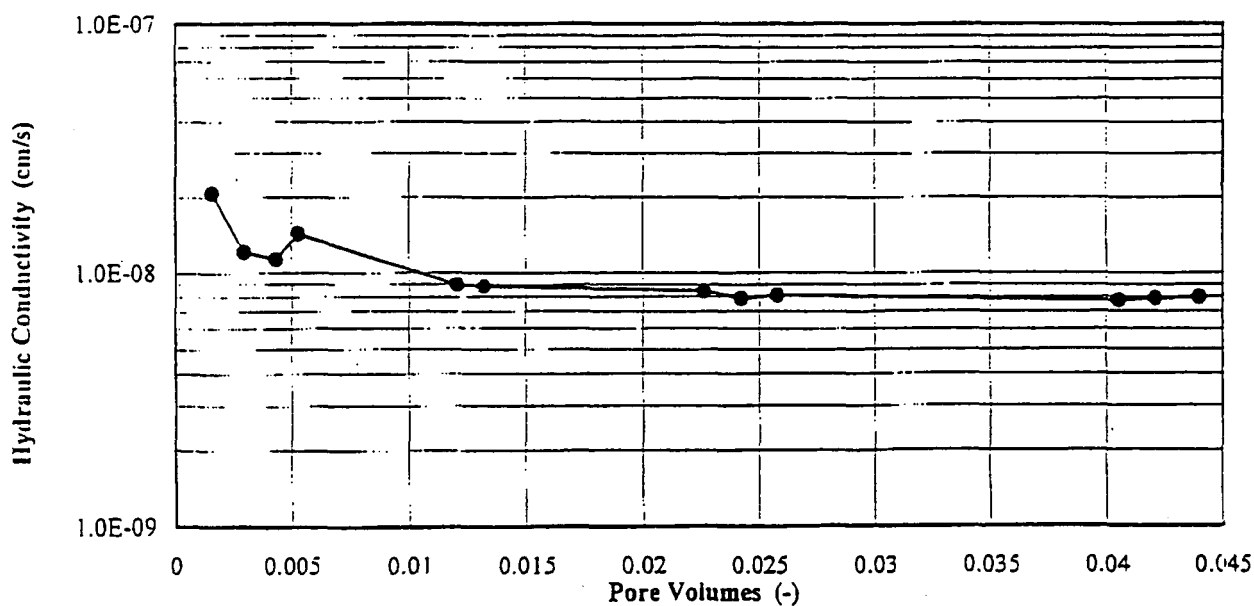
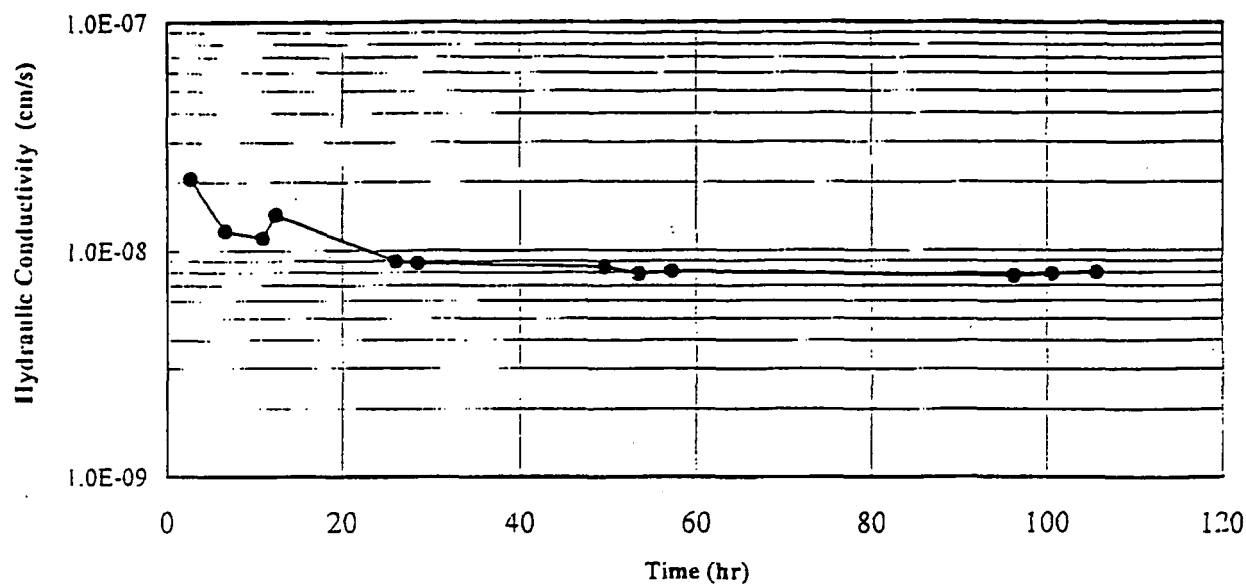
Project Name: OSDF - Phase II

Project No.: GQ0409

ASTM D 5084

HYDRAULIC CONDUCTIVITY TESTING

Figure



Sample ID	Lab Sample No.	Specimen Initial Condition		Consolidation Pressure, σ_c (psi)	Hydraulic Conductivity, k (cm/s)
		Dry Unit Weight (pcf)	Moisture Content (%)		
LP-II-117	98H308.3	115.7	16.9	5	7.9E-9

Note(s):

000183

2064

September 3, 1998

NCR No 20102-005:

EVALUATION OF PROPOSED CORRECTIVE ACTION:

This NCR is similar to NCR No. 20102-003. Contractor shall discontinue use of stockpile 98-10 until the CQC consultants approve the field conformance testing results. CQC Consultants shall verify that conformance test result meet the specification requirements. If test results do not meet specification requirements, the in-placed material has to be removed, replaced with acceptable clay liner by the contractor at no cost to FDF.

James G. Fisher for
Jim Jenkins
OSDF Engineering

000184



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO: G00409 TASK NO.: 04.1

DESCRIPTION: Phase one II

DATE: 20 day Aug month 1998 year

MATERIAL TYPE: Clay Liner

SAMPLE NO.: LCIT 106

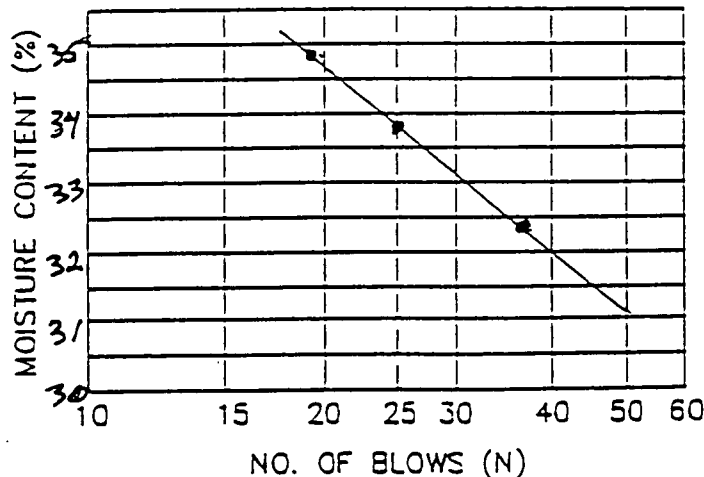
LIQUID LIMIT DETERMINATION

QA ID: 024

	TARE NO.		1.5	3.1	1.6
A	WT. OF TARE	(grams)	28.61	28.38	28.86
B	WT. OF WET SOIL & TARE	(grams)	39.26	41.51	44.24
C	WT. OF DRY SOIL & TARE	(grams)	36.69	38.20	40.27
D	WT. OF WATER = B-C	(grams)	2.57	3.31	3.97
E	WT. OF DRY SOIL = C-A	(grams)	8.08	9.82	11.41
F	MOISTURE CONTENT = (D/E)X100	(%)	31.80	33.71	34.80
N	NUMBER OF BLOWS		37	25	19

DRYING TARE NO.

M



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: 024

	TARE NO.		1.3	2.2
A	WT. OF TARE	(grams)	28.64	27.63
B	WT. OF WET SOIL & TARE	(grams)	41.67	40.64
C	WT. OF DRY SOIL & TARE	(grams)	39.78	38.75
D	WT. OF WATER = B-C	(grams)	1.89	1.89
E	WT. OF DRY SOIL = C-A	(grams)	11.14	11.12
F	MOISTURE CONTENT = (D/E)X100	(%)	17.00	17.00

LIQUID LIMIT (LL) = 34 PLASTIC LIMIT (PL) = 17 PLASTICITY INDEX (PI) = 17



2004
GEOSYNTEC CONSULTANTS

FLUOR DANIEL
FERNALD

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD

(ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO: GQ0409 TASK NO.: 04.1

DESCRIPTION: Phase ~~one~~ II

DATE: 27 day Aug month 1998 year

MATERIAL TYPE: Clay Liner

SAMPLE NO.: LP^{II}-106

SCIL SAMPLE SIZE $\frac{1}{2}$ in + 4 = 1.88 LBS
- 4 = 42.60 LBS

Total wt 44.48 LBS 20,195.5 grams
% + 4 4.2 %

APPROXIMATE MINIMUM WT. OF SAMPLE
(PASSING NO. 10 SIEVE)

SAND

FINE GRAIN

115

65

BEFORE WASH

AFTER WASH

TARE NO.

WT. OF DRY SAMPLE PLUS TARE

(grams)

WT. OF TARE

(grams)

WT. OF DRY SAMPLE

(grams)

SIEVE ANALYSIS

CA ID: AAE

SEIVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER	PROJECT SPECIFICATIONS
2"	50.0	0	0	100.0	100
1 1/2"	37.5	0	0	100.0	
1"	25.0	0	0	100.0	
3/4"	19.0	91.1	0.5	99.5	90-100
1/2"	12.5	329.2	1.6	98.4	
3/8"	9.5	498.2	2.5	97.5	
#4	4.75	853.7	4.2	95.8	
#10	2.00	13.0	4.4	95.6	91.6
20	0.850	20.7	7.0	93.0	89.1
40	0.425	28.3	9.6	90.4	86.6
60	0.250	35.2	11.9	88.1	84.4
100	0.150	44.0	14.9	85.1	81.5
200	0.075	54.2	18.4	81.6	78.2
PAN	—	54.5			50-100

% FINER = 100 - % RETAINED

Geo Syntec Consultants FILE NO. 2-14-PMS

CHECKED BY: *Q*

000186

SHEET NO. OF



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase one II

MATERIAL TYPE: Clay Liner

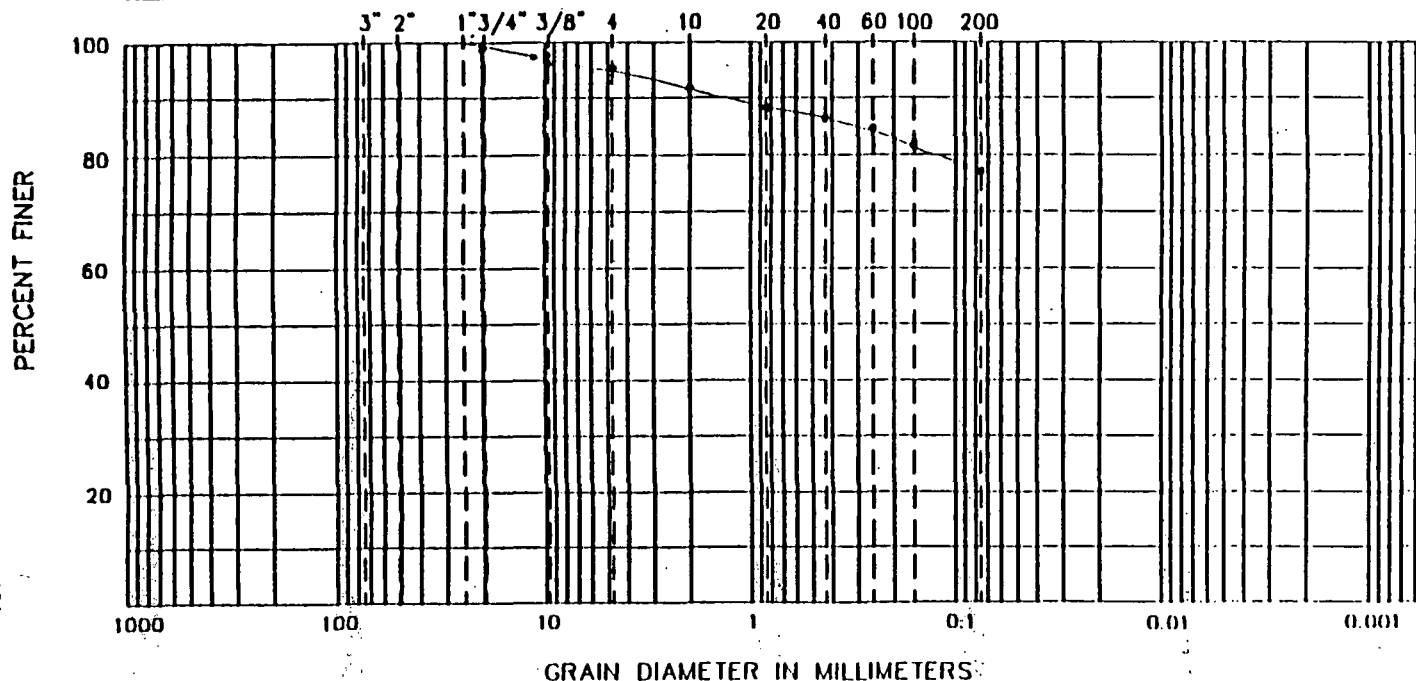
PROJECT NO.: GQ0409 TASK NO.: 04-1

DATE: 2 day Sept month 1998 year

SAMPLE NO.: CPII-106 QA ID: CL

CURVE COEFFICIENTS: (C_u) (C_c)

BOULDERS	COBBLES	GRAVEL		SAND			FINE	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES
U.S. STANDRAD SIEVE SIZES								



ATTERBERG LIMITS

(LL)

(PL)

(PI)

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100.0
2-in.	100.0
1 1/2-in.	100.0
1-in.	100.0
3/4-in.	99.9
1/2-in.	98.4
3/8-in.	97.5
NO. 4	95.8
NO. 10	91.6
NO. 20	89.1
NO. 40	86.6
NO. 60	84.4
NO. 100	81.5
NO. 200	78.2

HYDROMETER RESULTS

PARTICLE DIA.	% FINER

SOIL CLASSIFICATION (ASTM D 2487):



GEO SYNTEC CONSULTANTS
Geomechanics and Environmental Laboratory
Atlanta, Georgia

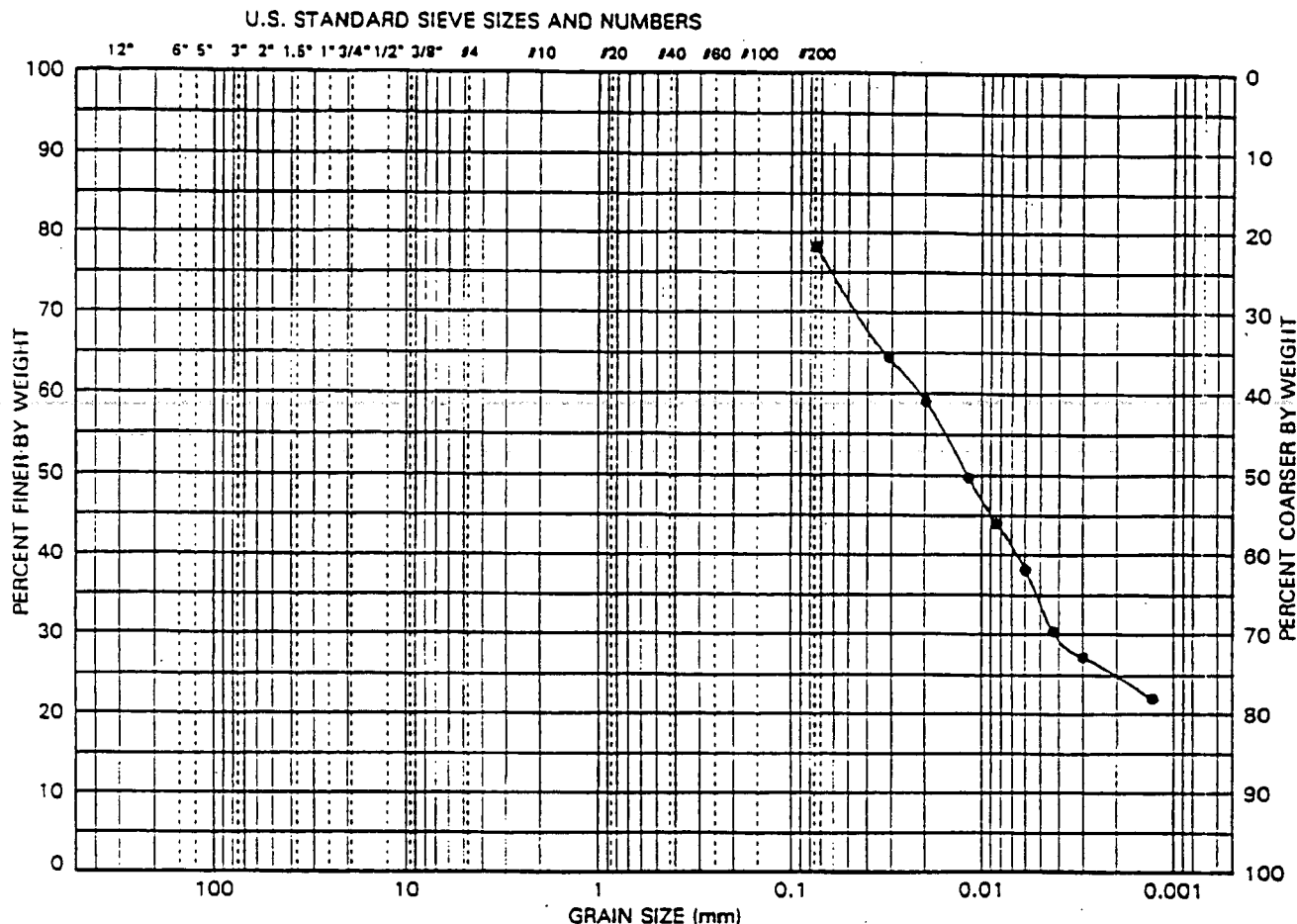
FIGURE
PROJECT: OSDF-Phase II
PROJECT NO.: GQ0409
DOCUMENT NO.:

2064

GS FORM:
4PS2 09/01/98

PARTICLE SIZE DISTRIBUTION AND PHYSICAL PROPERTIES

ASTM C 136, D 422, D 2487
D 3042 AND D 1318



SITE SAMPLE ID		LP-II-106	LIQUID LIMIT (%)											SOIL FRACTIONS	GRAVEL (%)								
LAB. SAMPLE NO.		98H291	PLASTIC LIMIT (%)												SAND (%)								
SAMPLE DEPTH (ft)			PLASTICITY INDEX												FINES (%)					78.2			
SOIL CLASSIFICATION:															SILT (%)					53.5			
															CLAY (%)					24.7			
														COEFF. UNIFORMITY (Cu)									
														COEFF. CURVATURE (Cc)									
PERCENT PASSING U.S. STANDARD SIEVE SIZES AND NUMBERS														PERCENT FINER									
3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#20	#40	#60	#100	#200	THAN HYDROMETER									
PERCENT PASSING SIEVE SIZES (mm)														PARTICLE DIAMETER (mm)									
75	50	37.5	25	19	12.5	9.5	4.75	2.00	0.850	0.425	0.250	0.150	0.075	0.050	0.020	0.005	0.002	0.001					
													78	72	59	34	25						

NOTES:

000188



GEOSYNTEC CONSULTANTS

FLUOR DANIEL
FERNALD

MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

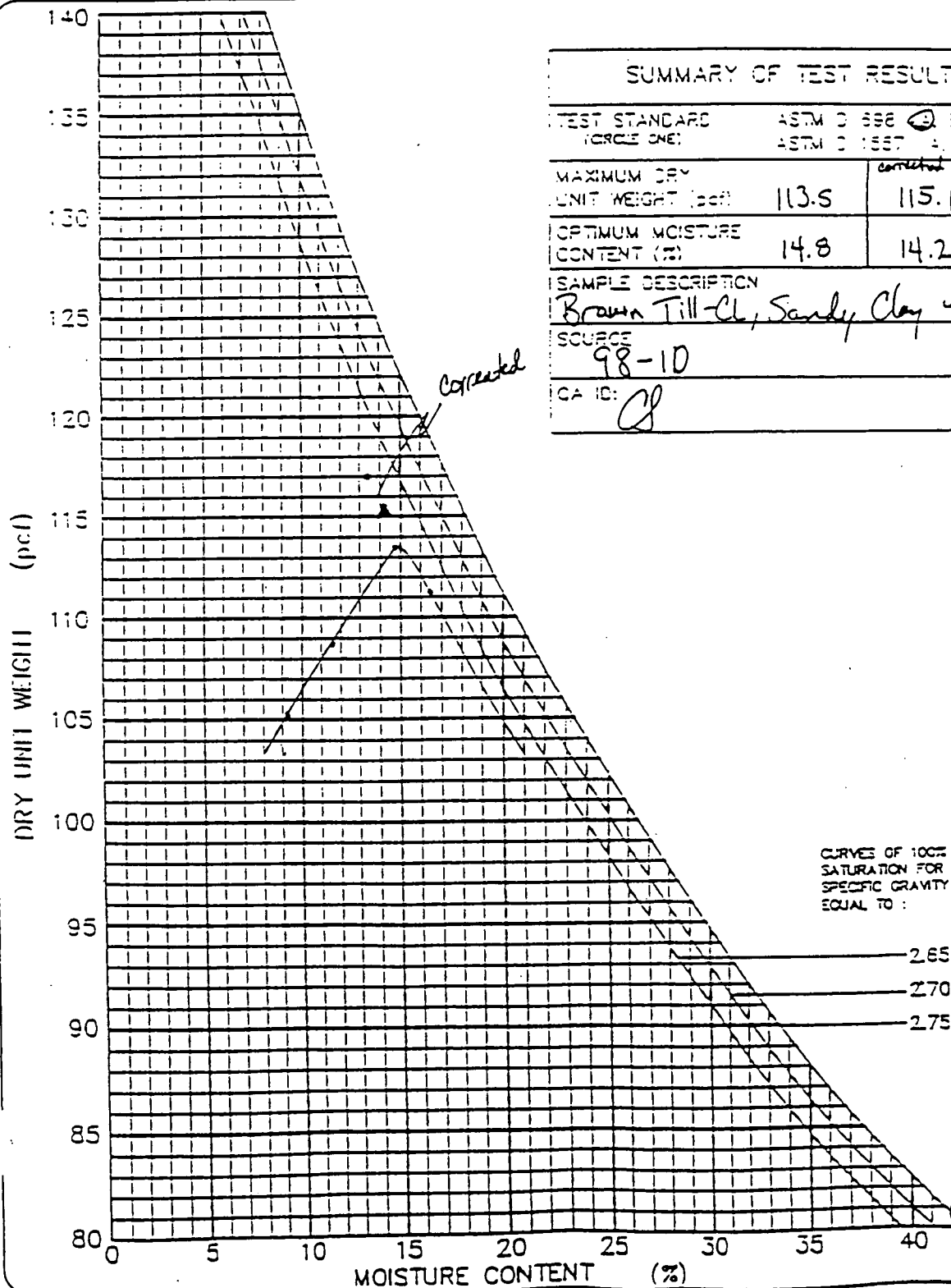
PROJECT NO: G00409 TASK NO.: 04.1

DESCRIPTION: Phase one II

DATE: ~~Aug 10~~ Sept month 1998 year

MATERIAL TYPE: Clay Liner

SAMPLE NO.: LPII-106



SUMMARY OF TEST RESULTS

TEST STANDARD	ASTM D 698	③ E. C.
FORCE ONE:	ASTM D 1557	A. E. C.
MAXIMUM DRY UNIT WEIGHT (pcf)	113.5	^{corrected} 115.1
OPTIMUM MOISTURE CONTENT (%)	14.8	14.2
SAMPLE DESCRIPTION	Brown Till-Cl, Sandy Clay w/gravel	
SOURCE	98-10	
QA ID:	CJ	

000189



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD A)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase one

MATERIAL TYPE: Clay liner

PROJECT NO.: G00409 TASK NO.: 04.

DATE: 29 day Aug month 1998 year

SAMPLE NO.: LP II-106

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-IN. (19-MM) SIEVE IS LESS THAN 30%, AND IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-MM) SIEVE IS LESS THAN 20%. ALL MATERIAL RETAINED ON THE NO. 4 (4.75-MM) SIEVE IS DISCARDED. USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718. USE A 4-IN. DIAMETER MOLD / 5.5-LB RAMMER / 12-IN. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DE-RE

	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	5946.7	6051.0	6182.6	6169.0	
B	WT. OF MOLD	(grams)	4209.4	4209.4	4209.4	4209.4	
C	WT. OF SOIL = A - B	(grams)	1737.3	1841.6	1973.2	1959.6	
D	WET UNIT WT. ⁽¹⁾ = C X 0.066	(pcf)	114.7	121.5	130.2	129.3	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	105.1	108.9	113.5	111.1	

NOTE: IF CALIBRATED MOLD OF 1/30 FT³ IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (IE., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT³ ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: DE-RE

	TARE NO.		24	33	26	11	
F	WT. OF TARE	(grams)	8.4	8.3	8.31	7.4	
G	WT. OF WET SOIL & TARE	(grams)	210.4	233.5	209.2	252.5	
H	WT. OF DRY SOIL & TARE	(grams)	193.5	210.1	183.5	218.0	
I	WT. OF WATER = G - H	(grams)	16.9	23.4	25.7	34.5	
J	WT. DRY SOIL = H - F	(grams)	185.1	201.8	175.2	210.6	
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.1	11.6	14.7	16.4	

000130



GeoSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

**CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS
CONTAINING OVERSIZE PARTICLES**

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO: 000439 TASK NO: 04.1

DESCRIPTION: Phase ~~2~~ II

DATE: 1 day Sept Month 1993 Year

MATERIAL TYPE: Clay Liner

SAMPLE NO: LPII-106

Weight of Total Sample	=	<u>44.48</u>
Weight of Oversize Fraction	=	<u>1.88</u>
Weight of Finer Fraction (-4)	=	<u>@ 95.8 42.60</u>
Percentage of Oversize Fraction	= (P _C)	<u>4.2</u>
Percentage of Finer Fraction (-4)	= (P _F)	<u>95.8</u>
Specific Gravity (Assumed)	= (G _M)	<u>2.72</u>

(W _F) =	Water Content -4, as decimal	=	<u>0.148</u>
(W _C) =	Water Content +4, as decimal	=	<u>0.015</u>
(δ _F) =	Dry Density of finer fraction	=	<u>113.5</u>
(δ _w) =	Unit Weight of Water	=	<u>62.4</u>

$$C_w = (W_F P_F) + (W_C P_C)$$

$$C_w = (95.8)(.148) + (4.2)(.015)$$

$$C_w = \underline{\underline{14.2\%}}$$

$$C_{SD} = \frac{100 \delta_F G_M \delta_w / (\delta_F P_F) + (G_M \delta_w P_F)}{(113.5)(4.2) + (2.72)(62.4)(95.8)}$$

$$C_{SD} = \underline{\underline{115.1}}$$

000191

2 of 3


GEOSYNTEC CONSULTANTS

 Geomechanics and Environmental
Laboratory

Sample ID: LP-II-106

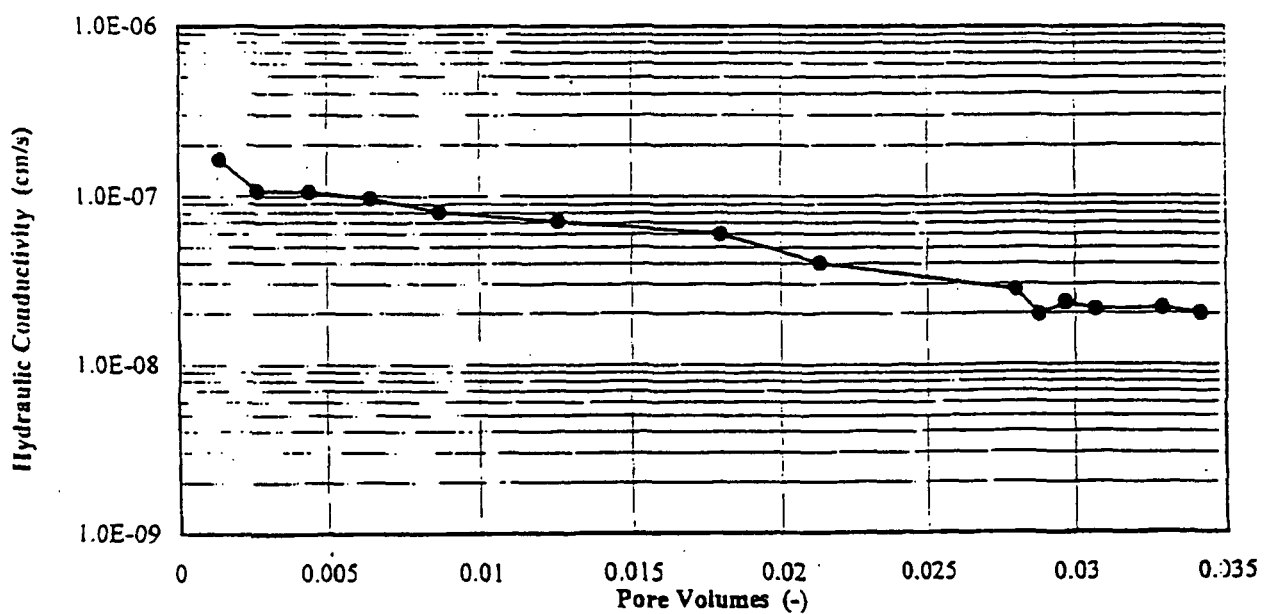
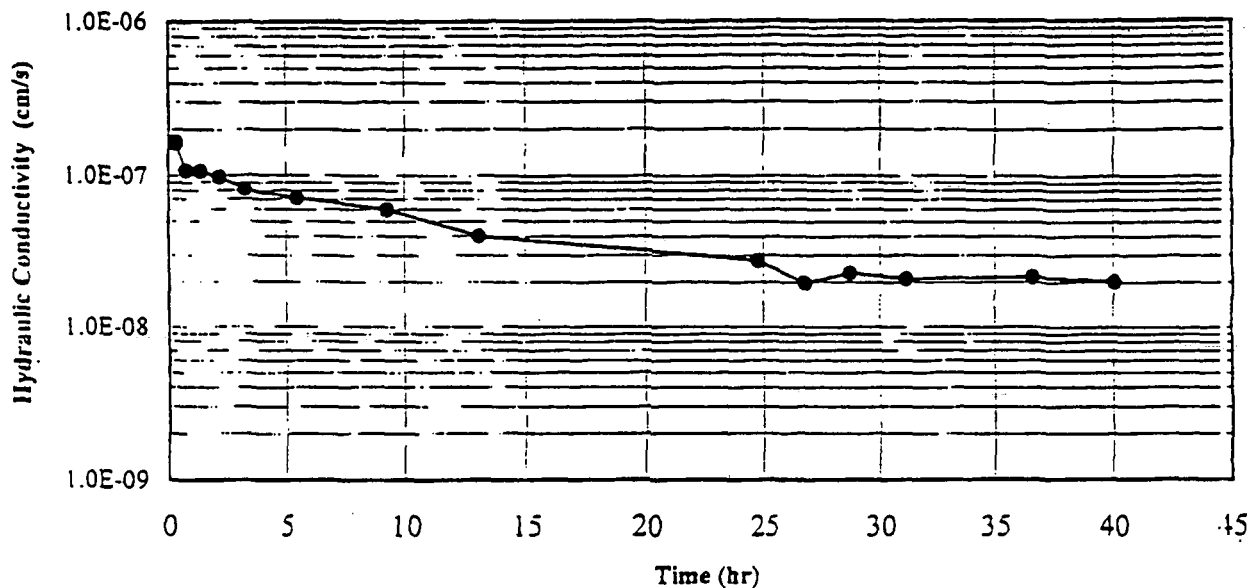
Project Name: OSDF - Phase II

Project No.: GQ0409

ASTM D 5084

HYDRAULIC CONDUCTIVITY TESTING

Figure



Sample ID	Lab Sample No.	Specimen Initial Condition		Consolidation Pressure, σ_v (psi)	Hydraulic Conductivity, k (cm/s)
		Dry Unit Weight (pcf)	Moisture Content (%)		
LP-II-106	98H291	114.4	17.0	5	2.2E-8

Note(s):



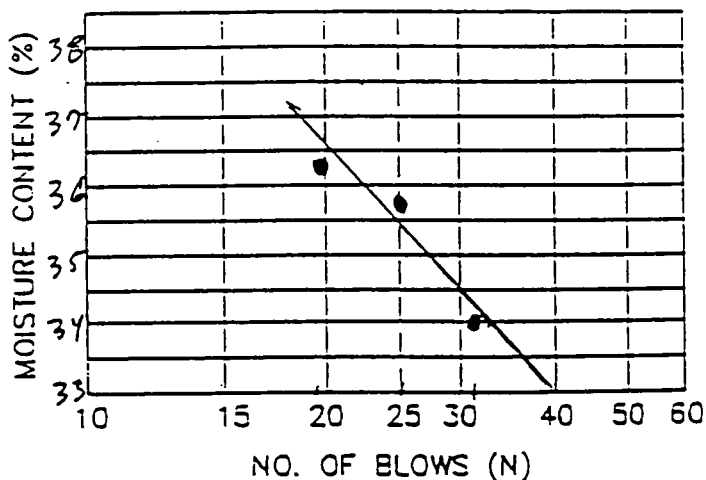
GEO SYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**
ATTERBERG LIMITS TEST (ASTM D 4318)
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)LOCATION: FERNALD, OHIOPROJECT NO.: G00409 TASK NO.: 04.1DESCRIPTION: Phase one IIDATE: 26 day Aug month 1998 yearMATERIAL TYPE: Clay LinerSAMPLE NO.: LP# 99
LIQUID LIMIT DETERMINATION
QA ID: DLE

	TARE NO.		1.6	2.9	3.1
A	WT. OF TARE	(grams)	28.85	31.47	28.40
B	WT. OF WET SOIL & TARE	(grams)	41.78	40.09	38.85
C	WT. OF DRY SOIL & TARE	(grams)	38.50	37.80	36.10
D	WT. OF WATER = B-C	(grams)	3.28	2.29	2.75
E	WT. OF DRY SOIL = C-A	(grams)	9.65	6.33	7.70
F	MOISTURE CONTENT = (D/E)X100	(%)	34.0	36.18	35.71
N	NUMBER OF BLOWS		31	19	25

DRYING TARE NO.

M



CURING TARE NO.

PLASTIC LIMIT DETERMINATION
QA ID: DLE

	TARE NO.		1.1	2.2
A	WT. OF TARE	(grams)	28.80	27.64
B	WT. OF WET SOIL & TARE	(grams)	38.61	38.15
C	WT. OF DRY SOIL & TARE	(grams)	37.20	36.60
D	WT. OF WATER = B-C	(grams)	1.41	1.55
E	WT. OF DRY SOIL = C-A	(grams)	8.47	8.96
F	MOISTURE CONTENT = (D/E)X100	(%)	16.79	17.30

 LIQUID LIMIT (LL) = 36 PLASTIC LIMIT (PL) = 17 PLASTICITY INDEX (PI) = 19.0



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD

(ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO: G00409 TASK NO.: 04.1

DESCRIPTION: Phase ~~one~~ II

DATE: 25 day Aug month 1998 year

MATERIAL TYPE: Clay Liner

SAMPLE NO.: LP II-99

SOIL SAMPLE SIZE

+4 = 1.20

-4 = 43.3

Total wt 79.5 LB 3583.47 grams

% +4 2.7 %

APPROXIMATE MINIMUM WT. OF SAMPLE
(PASSING NO. 10 SIEVE)

(grams)

SAND

115

FINE GRAIN

65

BEFORE WASH

AFTER WASH

TARE NO.

WT. OF DRY SAMPLE PLUS TARE

(grams)

WT. OF TARE

(grams)

WT. OF DRY SAMPLE

(grams)

 L-1
599.8
147.2
450.6

 L-1
214.1
147.2
66.9

SIEVE ANALYSIS

QA ID: BAE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER	PROJECT SPECIFICATIONS
2"	50.0	0	0	100.0	100
1 1/2"	37.5	0	0	100.0	
1"	25.0	0	0	100.0	
3/4"	19.0	108.6	0.5	99.5	90-100
1/2"	12.5	196.6	1.0	99.0	
3/8"	9.5	285.3	1.4	98.6	
#4	4.75	543.7	2.7	97.3	
#10	2.00	12.9	2.8	97.2	94.6
20	0.850	23.6	5.2	94.8	92.2
40	0.425	33.4	7.4	92.6	90.1
60	0.250	42.0	9.3	90.7	88.3
100	0.150	54.3	11.8	88.2	85.8
200	0.075	66.9	14.8	85.2	82.9
PAN	—	66.9	—	—	50-100
000194					

%FINER = 100 - Σ% RETAINED



GEO SYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: G00409 TASK NO.: 04

DESCRIPTION: Phase one II

DATE: 27 day Aug month 1998 year

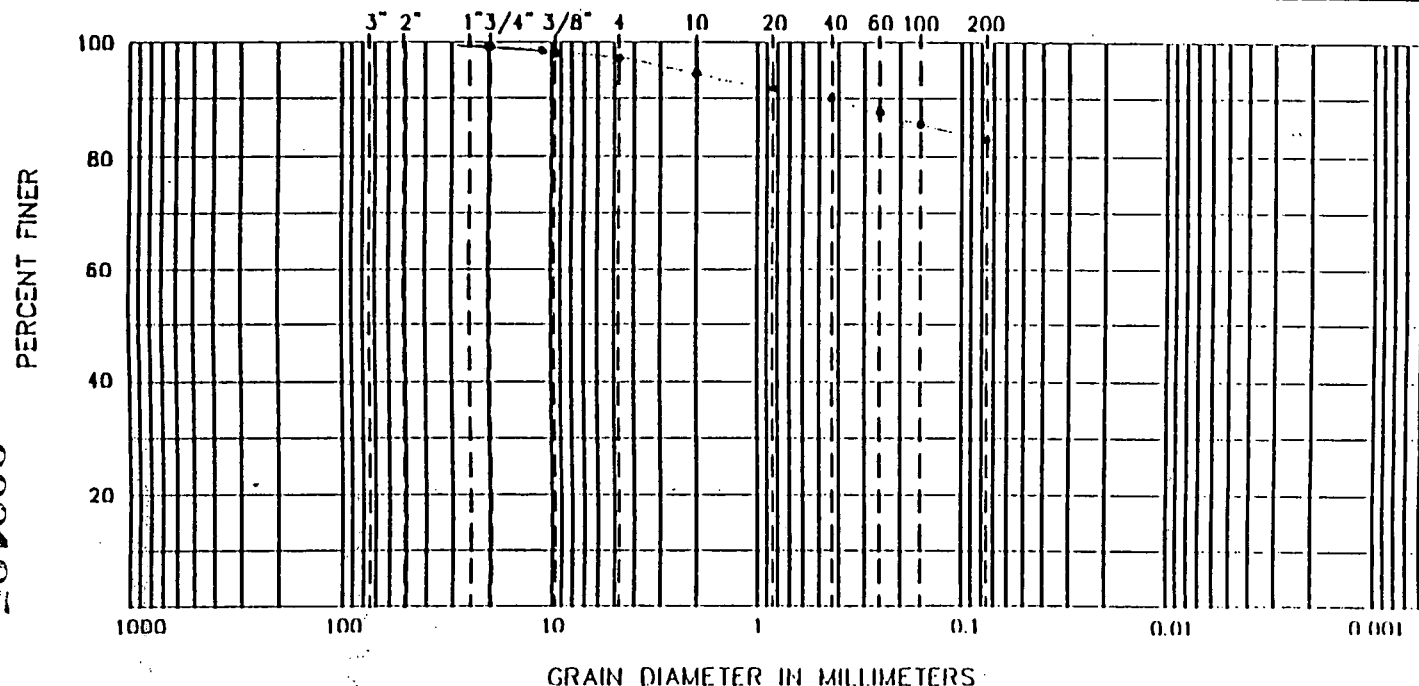
MATERIAL TYPE: Clay liner

SAMPLE NO.: LP11-99 QA ID: CL

CURVE COEFFICIENTS: (C_u) (C_c)

BOULDERS	COBBLES	GRAVEL		SAND			FINE	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

U.S. STANDARD SIEVE SIZES



ATTERBERG LIMITS

(LL) :

(PL) :

(PI) :

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	100
3/4-in.	99.5
1/2-in.	99.0
3/8-in.	98.6
NO. 4	97.3
NO. 10	94.6
NO. 20	92.2
NO. 40	90.1
NO. 60	88.3
NO. 100	85.8
NO. 200	82.9

HYDROMETER RESULTS

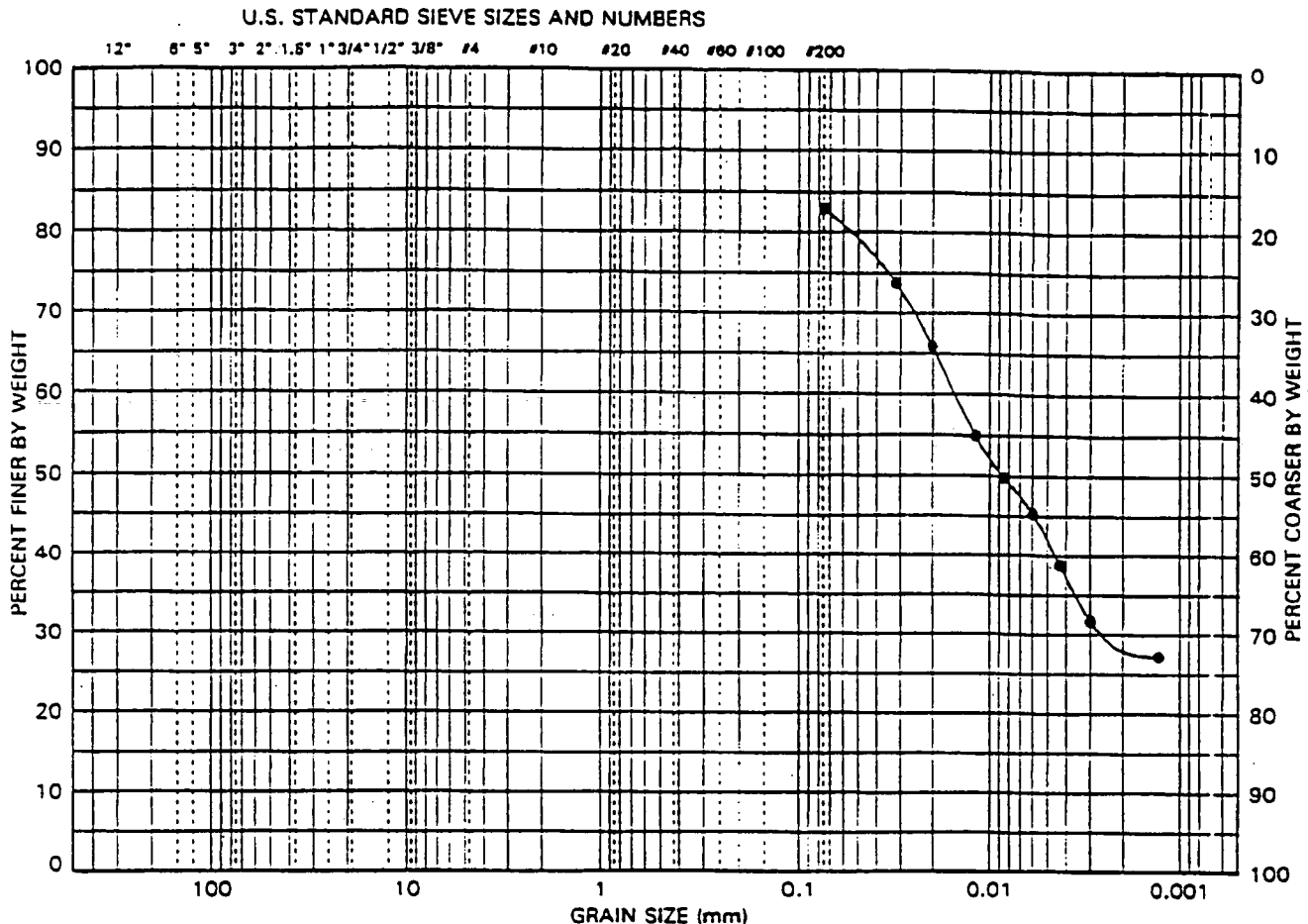
PARTICLE DIA.	% FINER

SOIL CLASSIFICATION (ASTM D 2487):

**Geomechanics and Environmental Laboratory
Atlanta, Georgia**

PROJECT: OSDF-Phase II
PROJECT NO.: GQ0409
DOCUMENT NO.:

ASTM C 138, D 422, D 2487
D 3042 AND D 1318



ESCALA DE 1/8"	COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
		GRAVEL		SAND			FINES	

SITE SAMPLE ID		LP-II-99		LIQUID LIMIT (%)										SOIL FRACTIONS	GRAVEL (%)					
LAB. SAMPLE NO.		98H265		PLASTIC LIMIT (%)											SAND (%)					
SAMPLE DEPTH (ft)				PLASTICITY INDEX											FINES (%)					82.9
SOIL CLASSIFICATION:															SILT (%)					53.4
															CLAY(%)					29.5
															COEFF. UNIFORMITY (Cu)					
COEFF. CURVATURE (Cc)																				
PERCENT PASSING U.S. STANDARD SIEVE SIZES AND NUMBERS														PERCENT FINER THAN HYDROMETER PARTICLE DIAMETER (mm)						
3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#20	#40	#60	#100	#200							
PERCENT PASSING SIEVE SIZES (mm)																				
75	60	37.5	25	19	12.5	9.5	4.75	2.00	0.850	0.425	0.250	0.150	0.075	0.060	0.020	0.006	0.002	0.001		
													83	79	66	42	30			

NOTES:

000196



GEO SYNTEC CONSULTANTS

Geomechanics and Environmental
Laboratory

Sample ID: LP-II-99

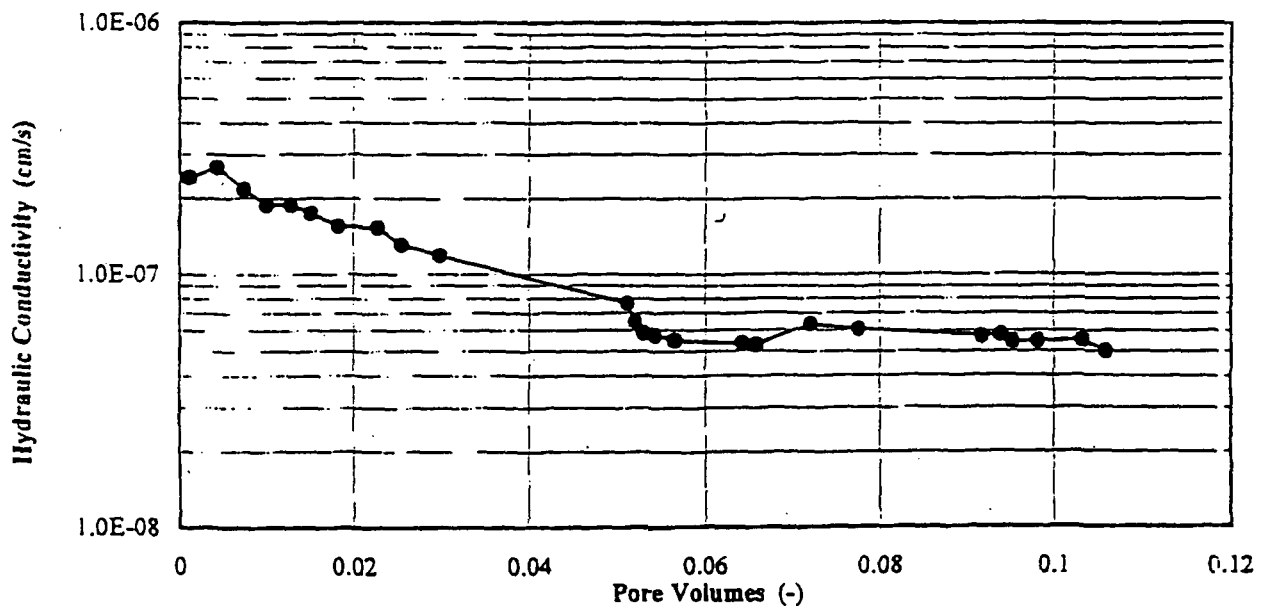
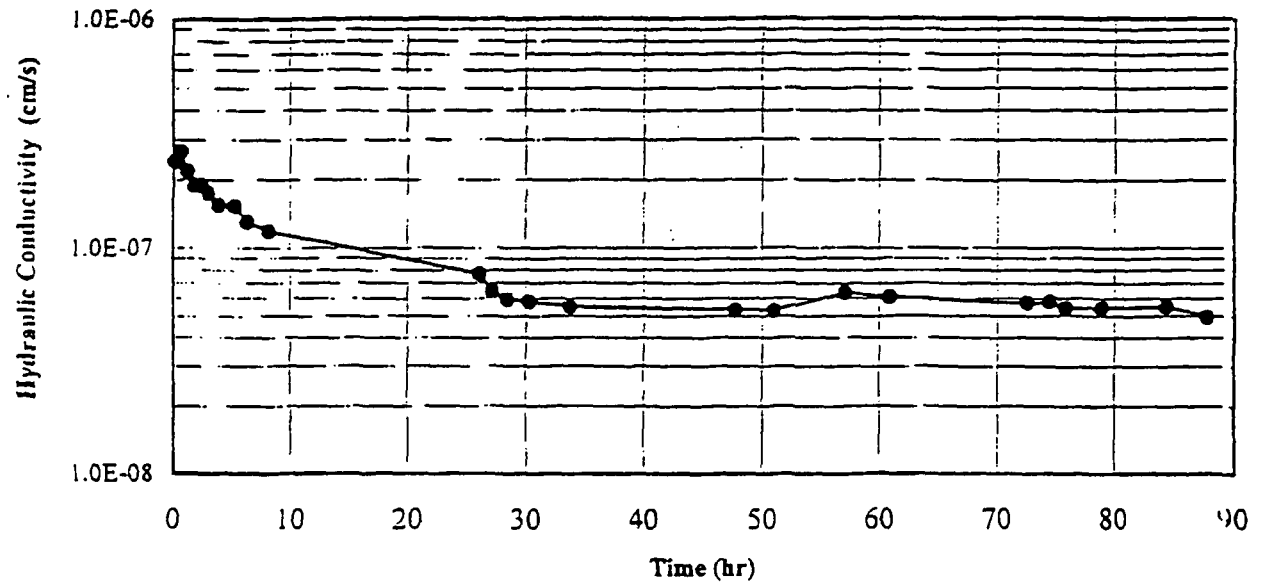
Project Name: OSDF - Phase II

Project No.: GQ0409

ASTM D 5084

HYDRAULIC CONDUCTIVITY TESTING

Figure



Sample ID	Lab Sample No.	Specimen Initial Condition		Consolidation Pressure, σ_c (psi)	Hydraulic Conductivity, k (cm/s)
		Dry Unit Weight (pcf)	Moisture Content (%)		
LP-II-99	98H265.A	116.7	15.2	5	5.3E-8

Note(s):

000197


GEOSYNTEC CONSULTANTS

 Geomechanics and Environmental
Laboratory

Sample ID: LP-II-99

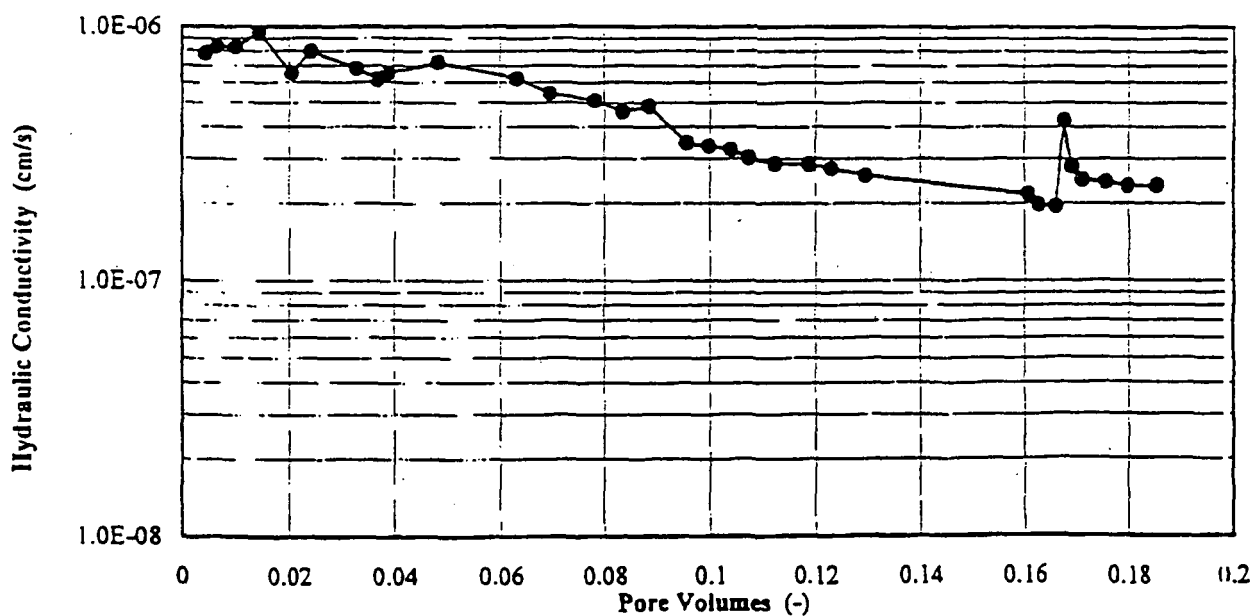
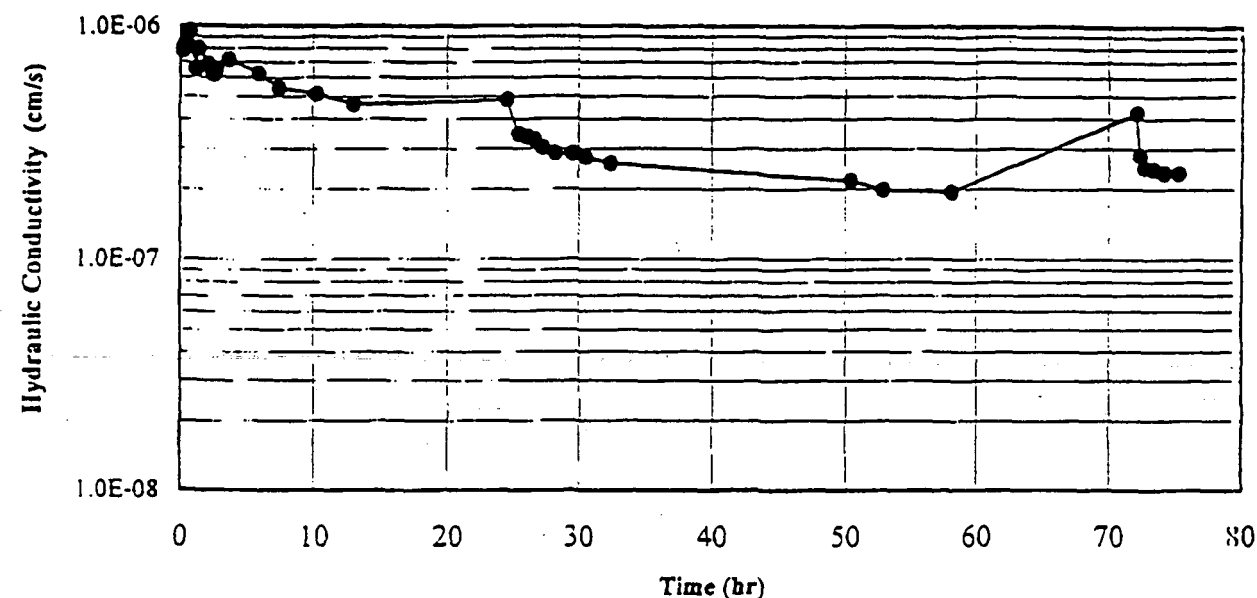
Project Name: OSDF - Phase II

Project No.: GQ0409

ASTM D 5084

HYDRAULIC CONDUCTIVITY TESTING

Figure



Sample ID	Lab Sample No.	Specimen Initial Condition		Consolidation Pressure, σ_c (psi)	Hydraulic Conductivity, k (cm/s)
		Dry Unit Weight (pcf)	Moisture Content (%)		
LP-II-99	98H265	115.6	15.8	5	2.4E-7

Note(s):



GEO SYNTec CONSULTANTS

FLUOR DANIEL
FERNALD

MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

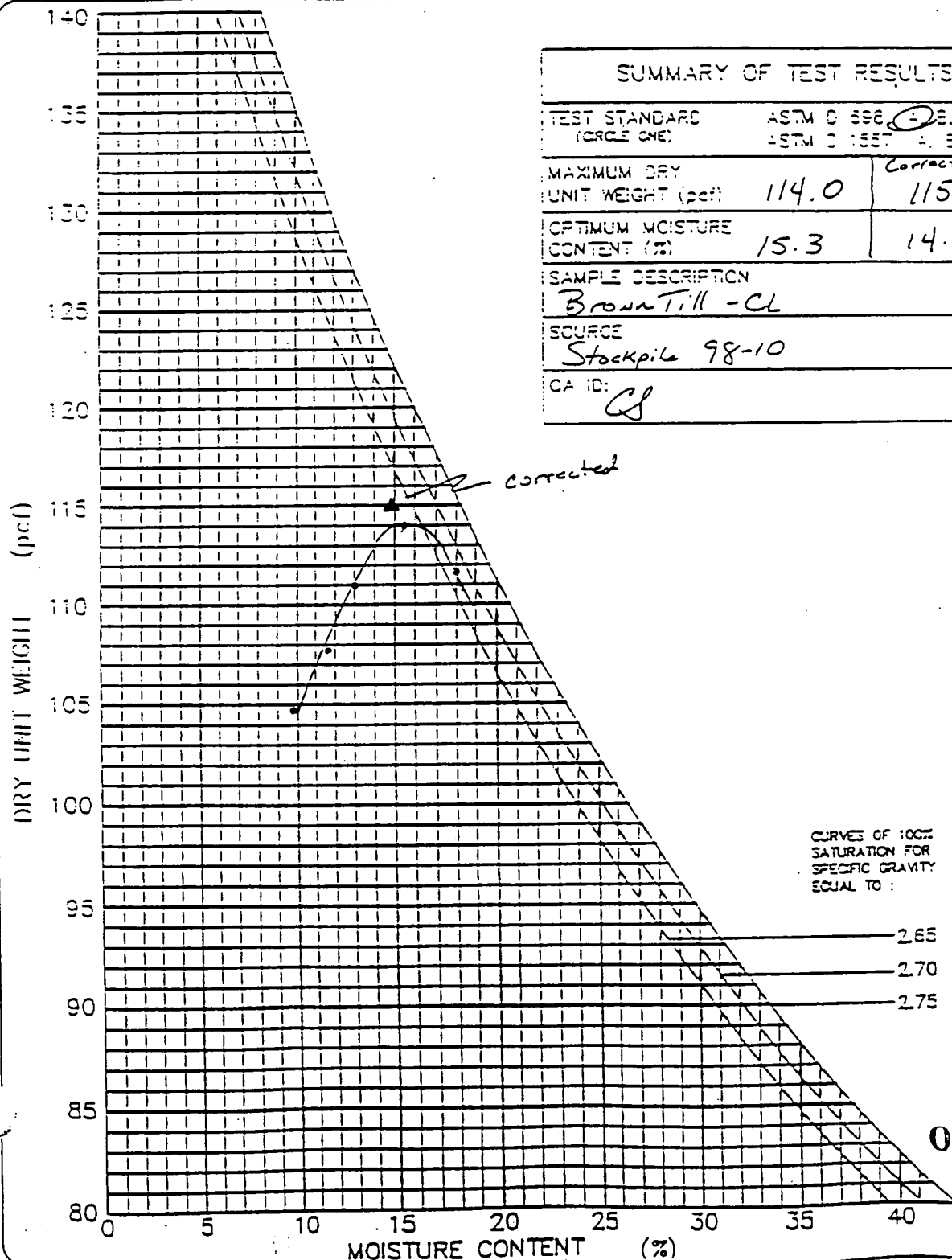
PROJECT NO: G00409 TASK NO.: 04.1

DESCRIPTION: Phase ~~one~~ II

DATE: 27 day Aug month 1998 year

MATERIAL TYPE: Clay Liner

SAMPLE NO.: LPII-99



000199

2 & 3



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD A)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04.

DESCRIPTION: Phase one II

DATE: 26 day Aug month 1998 year

MATERIAL TYPE: Clay liner

SAMPLE NO.: LP II-99

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, AND IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS LESS THAN 20%
ALL MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

	WATER ADDED	(ml)	4%	6%	8%	10%	12%
A	WT. OF SOIL & MOLD	(grams)	5955.8	6032.9	6110.0	6200.7	6205.2
B	WT. OF MOLD	(grams)	4209.4	4209.4	4209.4	4209.4	4209.4
C	WT. OF SOIL = A - B	(grams)	1746.4	1823.5	1900.6	1991.3	1995.8
D	WET UNIT WT. ⁽¹⁾ = C X 0.066	(pcf)	115.2	120.4	125.4	131.4	131.7
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	104.8	107.8	111.0	114.0	116.6

NOTE: IF CALIBRATED MOLD OF 1/30 FT³ IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT³ ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: DLE

	TARE NO.		33	10	26	11	24
F	WT. OF TARE	(grams)	8.3	7.3	8.3	7.4	8.4
G	WT. OF WET SOIL & TARE	(grams)	249.6	342.9	282.7	243.4	340.20
H	WT. OF DRY SOIL & TARE	(grams)	227.9	308.1	251.2	212.1	289.72
I	WT. OF WATER = G - H	(grams)	21.7	34.8	31.5	31.3	50.5
J	WT. DRY SOIL = H - F	(grams)	219.6	300.8	242.9	204.7	281.3
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.9	11.6	13.0	15.3	18.0

000200

2064

SEP 02 1998

Page 1 of 1



GeoSyntec Consultants

CONSTRUCTION NONCONFORMANCE REPORT

1. ORIGINATOR: Collin P. Sukow	2. TITLE/ORGANIZATION: Site CQC Manager/GeoSyntec	3. NCR NUMBER: 20102-6	4. DATE DISCOVERED: 1 Sept. 1998
5. RESPONSIBLE ORGANIZATION/PROJECT: GeoSyntec Consultants/OSDF Phase II PETRO ENVIRONMENTAL/OSDF Phase II		6. ASSESSMENT ACTIVITY: Construction Quality Control	7. HOLD TAG: () YES (X) NO 8. REMOVED (Initial/Date):
9. REQUIREMENTS (Identify requirement from document (e.g., CQA plan, specification, drawing, etc.)): OSDF PHASE II TECHNICAL SPECIFICATION SECTION 02225, PART 2.01 C Identify sources and volumes of clay liner and cap materials at least 15 Calendar days prior to use to allow for conformance testing of soil by the CQC consultant.....			
10. NONCONFORMANCE TYPE: Construction Nonconformance (X) Material Deviation ()			
11. NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required): Screened clay liner soils were used as compacted clay liner from Stockpile 98-11 before laboratory testing was completed.			
12. ORIGINATOR'S SIGNATURE: Collin P. Sukow		13. DATE PROVIDED TO RESPONSIBLE MANAGER: 1 Sept. 1998	
14. RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION: Continued use of Stockpile 98-11 is at contractors own risk as approved by FDF Construction Manager. Final review will be completed after receiving Final CQC conformance laboratory test results.		15. Use As-Is () Reject () Other (X) Repair () Rework ()	
16. RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION): KWASI BADU-TWENEBAAH, RESIDENT ENGINEER GEOSYNTEC			
17. RESPONSIBLE MANAGER'S SIGNATURE: K. Badu-Twenebaah		18. PROPOSED COMPLETION DATE: 9 SEPT 1998	19. DATE FORWARDED TO APPROVAL AUTHORITY: 1 SEPT 1998



GeoSyntec Consultants

Page 2 of 2

CONSTRUCTION NONCONFORMANCE REPORT

** EVALUATION OF PROPOSED CORRECTIVE ACTION: Comments (X)		Accept ()	Reject ()
SEE ATTACHED COMMENTS YA 9/3/98			
** APPROVAL AUTHORITY SIGNATURE:		** DATE:	
** VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):			
** VERIFIER'S SIGNATURE:		** DATE:	
** APPROVAL AUTHORITY SIGNATURE:		** DATE CLOSED:	
** CONTINUATION FROM BLOCK _____:			



GeoSyntec Consultants

Page 2 of 2

CONSTRUCTION NONCONFORMANCE REPORT

EVALUATION OF PROPOSED CORRECTIVE ACTION: Comments ()		Accept ()	Reject ()
<i>Verify test results to meet spec. requirements. If the test results do not meet spec. requirements, materials shall be removed and replaced and paid for by the contractor.</i>			
APPROVAL AUTHORITY SIGNATURE: <i>[Signature]</i> For Jim Jenkins		DATE: 9-11-98	
VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where): <i>Data has been reviewed and verified with acceptable results.</i>			
VERIFIER'S SIGNATURE: <i>[Signature]</i>		DATE: 9-11-98	
APPROVAL AUTHORITY SIGNATURE: <i>[Signature]</i>		DATE CLOSED: 9-11-98	
CONTINUATION FROM BLOCK _____			

000203



GeoSyntec Consultants

Page 1 of 2

CONSTRUCTION NONCONFORMANCE REPORT

ORIGINATOR: Collin P. Sukow	TITLE/ORGANIZATION: Site CQC Manager/GeoSyntec	NCR NUMBER: 20102-6	DATE DISCOVERED: 1 Sept. 1998
RESPONSIBLE ORGANIZATION/PROJECT: GeoSyntec Consultants/OSDF Phase II PetroEnvironmental OSDF Phase II		ASSESSMENT ACTIVITY: Construction Quality Control	HOLD TAG: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO REMOVED (Initial/Date):
<p>REQUIREMENTS (Identify requirement from document (e.g., CQA plan, specification, drawing, etc.)):</p> <p>OSDF PHASE II TECHNICAL SPECIFICATION SECTION 02225, PART 2.01 C</p> <p>Identify sources and volumes of clay liner and cap materials at least 15 Calendar days prior to use to allow for conformance testing of soil by the CQC Consultant.....</p>			
<p>NONCONFORMANCE TYPE: Construction Nonconformance (<input checked="" type="checkbox"/>) Material Deviation ()</p>			
<p>NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required):</p> <p>Screened clay liner soils were used as compacted clay liner from Stockpile 98-11 before laboratory testing was completed.</p>			
ORIGINATOR'S SIGNATURE: Collin P. Sukow		DATE PROVIDED TO RESPONSIBLE MANAGER: 1 Sept. 1998	
RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION:		Use As-Is () Reject () Other <input checked="" type="checkbox"/> Repair () Rework ()	
<p>Continued use of stockpile 98-11 is at contractors own risk as approved by FDF construction manager. Final review will be completed after receiving Final CQC conformance laboratory test results.</p>			
RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION): KWASI BADU-TWENEBAAH, RESIDENT ENGINEER GEOSYNTEC			
RESPONSIBLE MANAGER'S SIGNATURE: K. Badu-Twenebaah	PROPOSED COMPLETION DATE: 9 SEPT 1998	DATE FORWARDED TO APPROVAL AUTHORITY: 1 SEPT 1998	

000204

September 3, 1998

NCR No 20102-006:

EVALUATION OF PROPOSED CORRECTIVE ACTION:

This NCR is similar to NCR No. 20102-003 and 20102-005. Contractor shall discontinue use of stockpile 98-10 until the CQC consultants approve the field conformance testing results. CQC Consultants shall verify that conformance test result meet the specification requirements. If test results do not meet specification requirements, the in-placed material has to be removed, replaced with acceptable clay liner by the contractor at no cost to FDF.

for *James Afsheer*
Jim Jenkins
OSDF Engineering

000205

2064



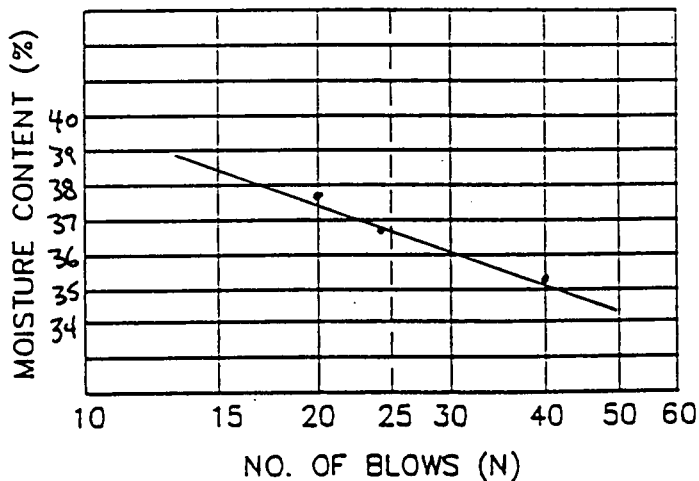
GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**
ATTERBERG LIMITS TEST (ASTM D 4318)
PROJECT: ON-SITE DISPOSAL FACILITY (OSOF)LOCATION: FERNALD, OHIOPROJECT NO: G00409 TASK NO.: 04.1DESCRIPTION: Phase ~~ONE~~ IIDATE: 18 day Sept month 1998 yearMATERIAL TYPE: CLAY LinerSAMPLE NO.: LP II - 121
LIQUID LIMIT DETERMINATION
QA ID: DE/CS

	TARE NO.		2.9	3.1	1.6	
A	WT. OF TARE	(grams)	31.46	28.38	28.85	
B	WT. OF WET SOIL & TARE	(grams)	41.94	44.41	43.54	
C	WT. OF DRY SOIL & TARE	(grams)	39.21	40.10	39.51	
D	WT. OF WATER = B-C	(grams)	2.73	4.31	4.03	
E	WT. OF DRY SOIL = C-A	(grams)	7.75	11.72	10.66	
F	MOISTURE CONTENT = (D/E)X100	(%)	35.2	36.8	37.8	
N	NUMBER OF BLOWS		40	24	20	

DRYING TARE NO.

CURING TARE NO.


PLASTIC LIMIT DETERMINATION
QA ID: DE/CS

	TARE NO.		1.5	1.3	
A	WT. OF TARE	(grams)	28.59	28.63	
B	WT. OF WET SOIL & TARE	(grams)	36.50	36.92	
C	WT. OF DRY SOIL & TARE	(grams)	35.32	35.63	
D	WT. OF WATER = B-C	(grams)	1.18	1.29	
E	WT. OF DRY SOIL = C-A	(grams)	6.73	7.00	
F	MOISTURE CONTENT = (D/E)X100	(%)	17.5	18.4	

 LIQUID LIMIT (LL) = 37.0 PLASTIC LIMIT (PL) = 18.0 PLASTICITY INDEX (PI) = 19

000206



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD

(ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO: GQ0409 TASK NO.: 04.1

DESCRIPTION: Phase ~~one~~ II

DATE: 1 day Sept month 1998 year

MATERIAL TYPE: Clay Liner

SAMPLE NO.: LP II-121

SOIL SAMPLE SIZE $+4 = 658.4 = 1.45 \text{ lbs}$ Total wt ~~4235.28~~ 19,208 grams
 $-4 = 18459.6 = 40.89 \text{ lbs}$ % +4 24 %

APPROXIMATE MINIMUM WT. OF SAMPLE
(PASSING NO. 10 SIEVE)

(grams)

SAND

115

FINE GRAIN

65

TARE NO.

WT. OF DRY SAMPLE PLUS TARE

(grams)

WT. OF TARE

(grams)

WT. OF DRY SAMPLE

(grams)

BEFORE WASH

AFTER WASH

~~573.7~~ 541.4

169.23

~~401.6~~ 101.6

101.60

439.8

67.63

SIEVE ANALYSIS

CA ID: 04E

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER	PROJECT SPECIFICATION
2"	50.0	0	0	100.0	100
1 1/2"	37.5	0	0	100.0	
1"	25.0	27.80	20.1	99.9	
3/4"	19.0	180.00	0.7	99.3	90-100
1/2"	12.5	325.30	1.7	98.3	
3/8"	9.5	434.10	2.3	97.7	
#4	4.75	650.40	3.4	96.6	
#10	2.00	10.70	2.4	97.6	94.3
20	0.850	19.96	4.5	95.5	92.3
40	0.425	30.31	6.9	93.1	89.9
60	0.250	39.80	9.0	91.0	87.9
100	0.150	52.50	12.0	88.0	85.0
200	0.075	67.60	15.4	84.6	81.7
PAN	—	67.61			50-100

% FINER = 100 - Σ % RETAINED



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04-1

DESCRIPTION: Phase one II

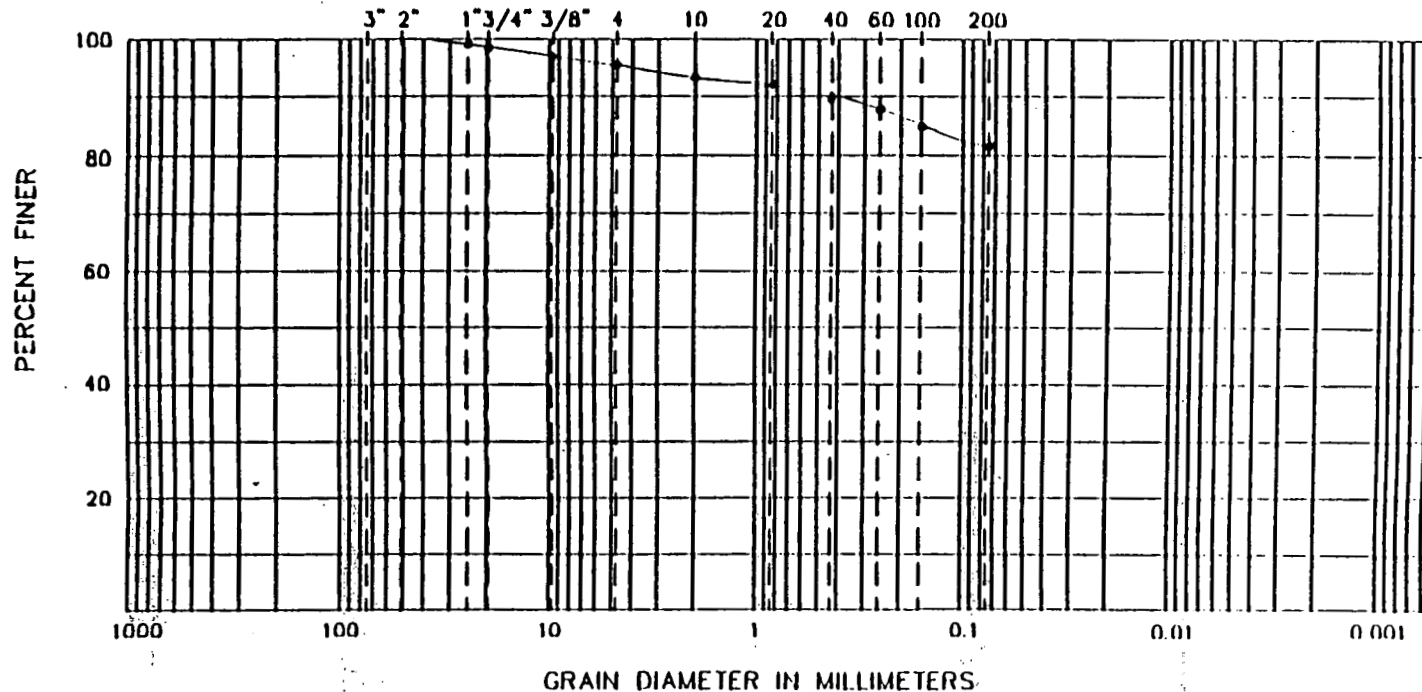
DATE: 2 day Sept month 1998 year

MATERIAL TYPE: Clay liner

SAMPLE NO.: LPT-121 QA ID: CS

CURVE COEFFICIENTS: (C_u) (C_c)

BOULDERS	COBBLES	GRAVEL		SAND			FINE	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES
U.S. STANDRAD SIEVE SIZES								



ATTERBERG LIMITS

(LL)
(PL)
(PI)

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.9
3/4-in.	99.3
1/2-in.	98.3
3/8-in.	97.7
NO. 4	96.6
NO. 10	94.2
NO. 20	92.3
NO. 40	89.9
NO. 60	87.9
NO. 100	85.1
NO. 200	81.8

HYDROMETER RESULTS

PARTICLE DIA.	% FINER

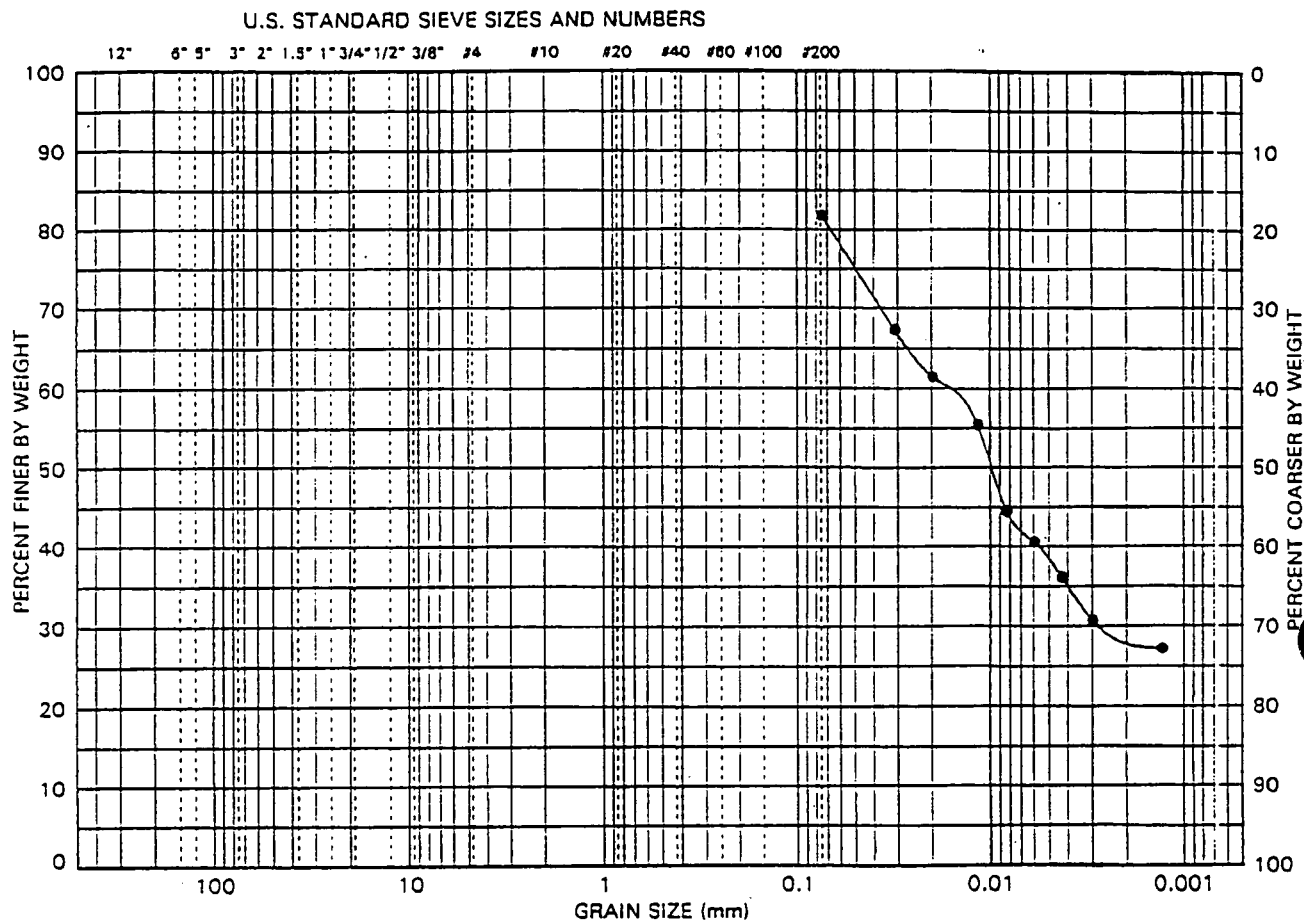
SOIL CLASSIFICATION (ASTM D 2487): _____

000208

GS FORM:
4PS2 09/08/98

PARTICLE SIZE DISTRIBUTION AND PHYSICAL PROPERTIES

ASTM C 136, D 422 D 2487
D 3042 AND D 4318



BOULDERS	COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
		GRAVEL		SAND			FINES	

SITE SAMPLE ID		LP-II-121		LIQUID LIMIT (%)										SOIL FRACTIONS	GRAVEL (%)					
LAB. SAMPLE NO.		98111		PLASTIC LIMIT (%)											SAND (%)					
SAMPLE DEPTH (ft)				PLASTICITY INDEX											FINES (%)					81.8
SOIL CLASSIFICATION:															SILT (%)					52.8
															CLAY(%)					29.0
														COEFF. UNIFORMITY (Cu)						
														COEFF. CURVATURE (Cc)						
PERCENT PASSING U.S. STANDARD SIEVE SIZES AND NUMBERS														PERCENT FINER THAN HYDROMETER PARTICLE DIAMETER (mm)						
3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#20	#40	#60	#100	#200							
PERCENT PASSING SIEVE SIZES (mm)																				
75	50	37.5	25	19	12.5	9.5	4.75	2.00	0.850	0.425	0.250	0.150	0.075	0.050	0.020	0.005	0.002	0.001		
													82	75	61	38	29			

NOTES:

000209



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD A)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04.

DESCRIPTION: Phase ~~one~~ II

DATE: 2 day Sept. month 1998 year

MATERIAL TYPE: Clay Liner

SAMPLE NO.: LP II 121

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, AND IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS LESS THAN 20%. ALL MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS DISCARDED.

USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.

USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: AE

	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	5969.4	6069.4	6205.2	6178.0	
B	WT. OF MOLD	(grams)	4209.4	4209.4	4209.4	4209.4	4209.4
C	WT. OF SOIL = A - B	(grams)	1760.0	1860.0	1995.8	1968.6	
D	WET UNIT WT. ⁽¹⁾ = C X 0.066	(pcf)	116.2	122.8	131.7	130.0	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	104.3	108.5	114.1	111.2	

NOTE: IF CALIBRATED MOLD OF 1/30 FT³ IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT³ ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FIELDED.

MOISTURE CONTENT - ASTM D 2216

QA ID: AE

	TARE NO.		25	20	22	23	
F	WT. OF TARE	(grams)	8.25	8.368.48	8.4	8.4	
G	WT. OF WET SOIL & TARE	(grams)	286.8	245.7	244.6	256.7	
H	WT. OF DRY SOIL & TARE	(grams)	258.2	218.0	213.1	220.9	
I	WT. OF WATER = G - H	(grams)	28.6	27.7	31.5	35.8	
J	WT. DRY SOIL = H - F	(grams)	250.0	209.6	204.7	212.5	
K	MOISTURE CONTENT = (I/J) X 100	(%)	11.4	13.2	15.4	16.8	2064

000210



GEOSYNTEC CONSULTANTS

FLUOR DANIEL
FERNALD

MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

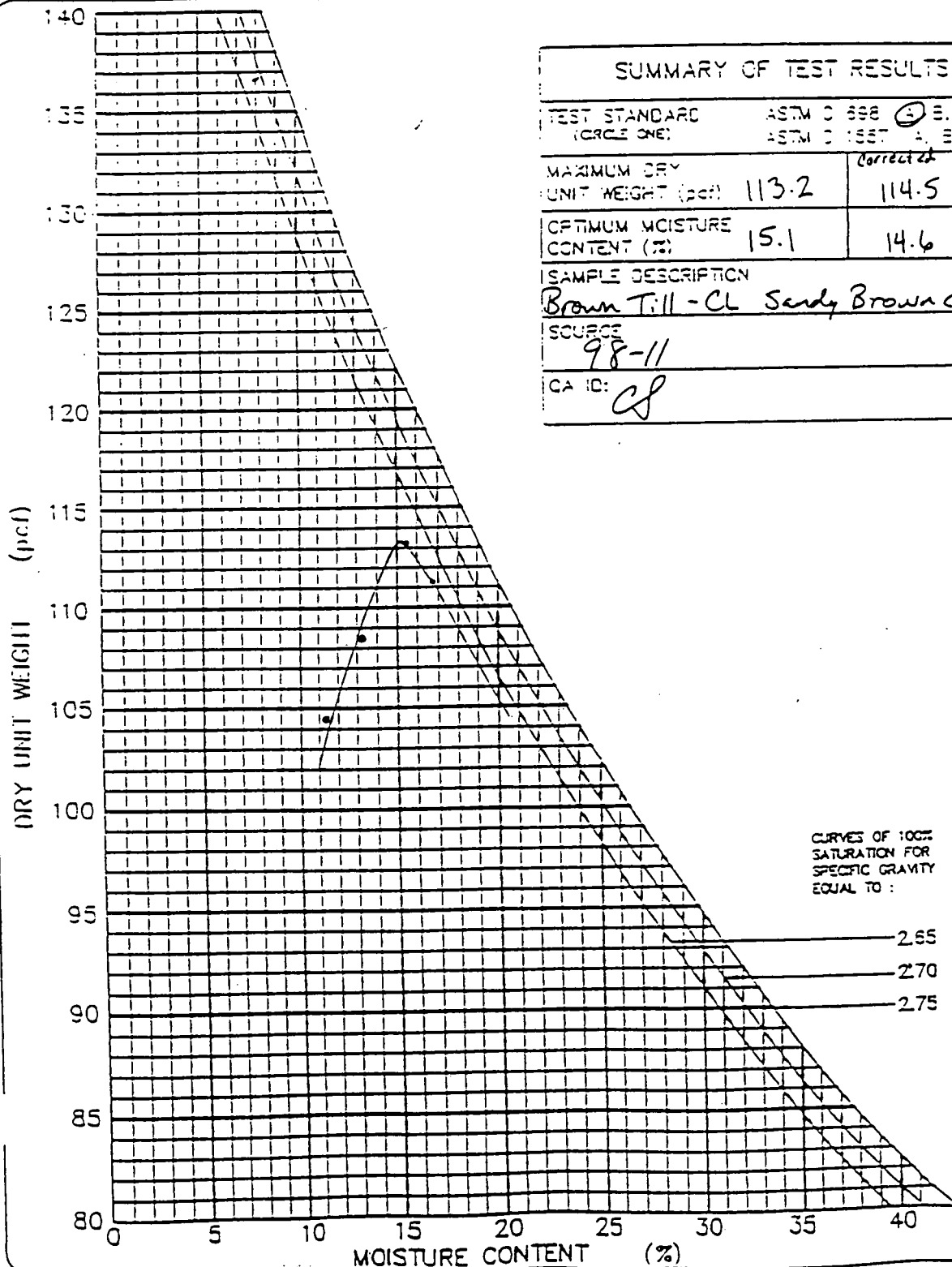
PROJECT NO: G00409 TASK NO.: 04.1

DESCRIPTION: Phase ~~one~~ II

DATE: 3 day Sept month 1998 year

MATERIAL TYPE: Clay Liner

SAMPLE NO.: LP#-121



000211



GeoSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

2064

**CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS
CONTAINING OVERSIZE PARTICLES**

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, CHIC

PROJECT NO: GC0409 TASK NO: GC-1

DESCRIPTION: Phase ~~III~~ II

DATE: 3 day Sept month 1991 year

MATERIAL TYPE: Clay Liner

SAMPLE NO: LPII-121

Weight of Total Sample	=	<u>19,208 g</u>
Weight of Oversize Fraction	=	<u>658.4</u>
Weight of Finer Fraction (-4)	=	<u>18,459.6</u>
Percentage of Oversize Fraction	= (P _C)	<u>3.4%</u>
Percentage of Finer Fraction (-4)	= (P _F)	<u>96.6%</u>
Specific Gravity (Assumed)	= (G _M)	<u>2.72</u>

(W _F) =	Water Content +4, as decimal	=	<u>0.151</u>
(W _C) =	Water Content +4, as decimal	=	<u>0.015</u>
(δ _F) =	Dry Density of finer fraction	=	<u>113.2</u>
(δ _w) =	Unit Weight of Water	=	<u>62.4</u>

$$C_w = (W_F P_F) + (W_C P_C)$$

$$C_w = (96.6)(0.151) + (3.4)(0.015)$$

$$C_w = \underline{\underline{14.6}}$$

$$C S_D = 100 \delta_F G_M \delta_w / (\delta_F P_F + (G_M \delta_w P_C))$$

$$C S_D = \frac{100(113.2)(2.72)(62.4)}{(2.72)(62.4)(96.6) + (3.4)(113.2)}$$

$$C S_D = \underline{\underline{114.5}}$$

000212



GEO SYNTEC CONSULTANTS

Geomechanics and Environmental
Laboratory

Sample ID: LP-II-121

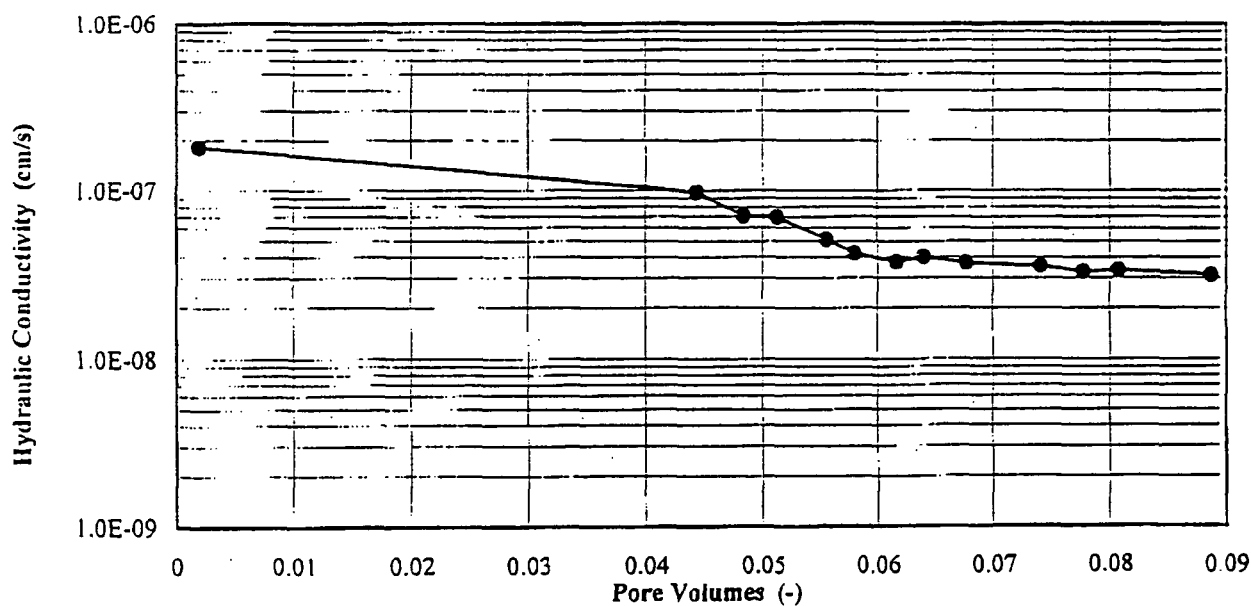
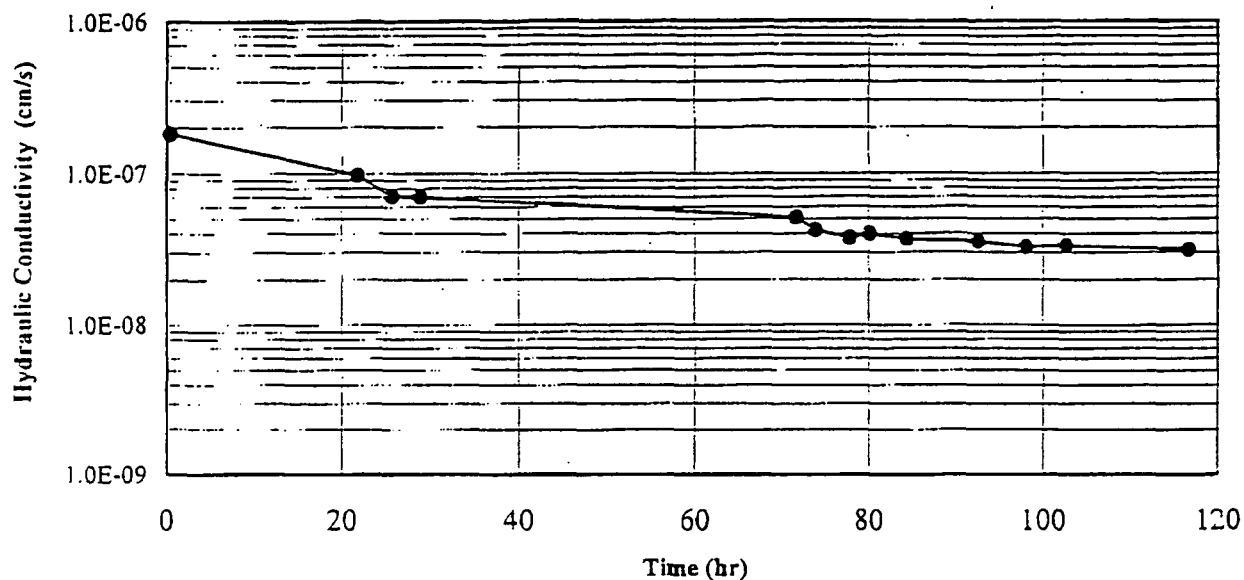
Project Name: OSDF - Phase II

Project No.: GQ0409

ASTM D 5084

HYDRAULIC CONDUCTIVITY TESTING

Figure



Sample ID	Lab Sample No.	Specimen Initial Condition		Consolidation Pressure, σ_c (psi)	Hydraulic Conductivity, k (cm/s)
		Dry Unit Weight (pcf)	Moisture Content (%)		
LP-II-121	98111	113.8	16.8	5	3.3E-8

Note(s):

000213



GEO SYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

ATTERBERG LIMITS TEST (ASTM D 4318)

2064

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO: GQ0409 TASK NO.: 04.1

DESCRIPTION: Phase ~~one~~ II

DATE: 31 day Aug month 1998 year

MATERIAL TYPE: Clay Liner

SAMPLE NO.: LP II-117

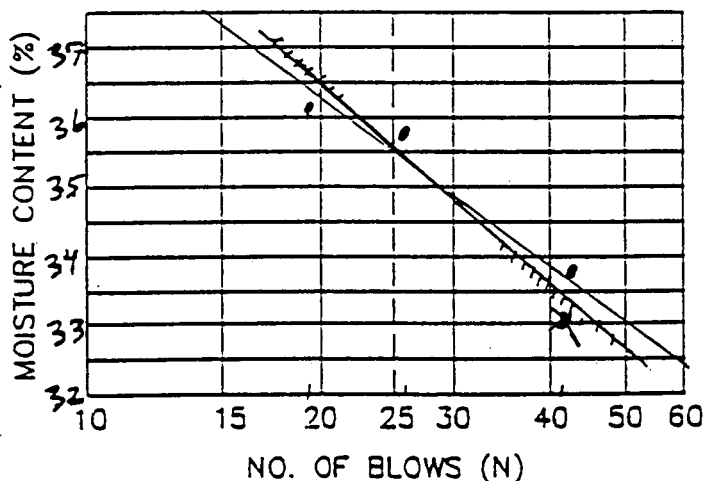
LIQUID LIMIT DETERMINATION

QA ID: DLF

	TARE NO.		209	1.5	1.3
A	WT. OF TARE	(grams)	31.47	28.61	28.64
B	WT. OF WET SOIL & TARE	(grams)	41.29	42.46	39.27
C	WT. OF DRY SOIL & TARE	(grams)	38.81	38.82	36.45
D	WT. OF WATER = B-C	(grams)	2.48	3.64	2.82
E	WT. OF DRY SOIL = C-A	(grams)	25.72 7.34	10.21	7.81
F	MOISTURE CONTENT = (D/E)X100 (%)		33.00	35.70	36.10
N	NUMBER OF BLOWS		42	26	19

DRYING TARE NO.

K



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLF

	TARE NO.		1.6	3.1
A	WT. OF TARE	(grams)	28.86	28.38
B	WT. OF WET SOIL & TARE	(grams)	37.46	37.83
C	WT. OF DRY SOIL & TARE	(grams)	36.20	36.47
D	WT. OF WATER = B-C	(grams)	1.26	1.36
E	WT. OF DRY SOIL = C-A	(grams)	7.34	8.10
F	MOISTURE CONTENT = (D/E)X100 (%)		17.2	16.8

LIQUID LIMIT (LL) = $\frac{35.5}{35}$ PLASTIC LIMIT (PL) = 17 PLASTICITY INDEX (PI) = $\frac{18.5}{18}$



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD

(ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO: GQ0409 TASK NO.: 04.1

DESCRIPTION: Phase one II

DATE: 29 day Aug month 1998 year

MATERIAL TYPE: Clay Liner

SAMPLE NO.: L.P. II-117

SOIL SAMPLE SIZE $+4 = 3.0$
 $-4 = 53.63$

Total wt 56.65 LBS 25695.7 grams
% +4 5.3 %

APPROXIMATE MINIMUM WT. OF SAMPLE
(PASSING NO. 10 SIEVE)

(grams)

SAND

115

FINE GRAIN

55

TARE NO.

(-4 mat)

BEFORE WASH

AFTER WASH

WT. OF DRY SAMPLE PLUS TARE

(grams)

L-4
741.1

L-4
268.78

WT. OF TARE

(grams)

146.6

146.60

WT. OF DRY SAMPLE

(grams)

594.5

*

122.18

SIEVE ANALYSIS

GA ID: P4E

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER	PROJECT SPECIFICATION
2"	50.0	0	0	100.0	100
1 1/2"	37.5	0	0	100.0	
1"	25.0	28.8	0.1	99.9	
3/4"	19.0	251.0	1.0	99.0	90-106
1/2"	12.5	562.1	2.2	97.8	
3/8"	9.5	819.9	3.2	96.8	
#4	4.75	1358.3	5.3	94.7	
#10	2.00	17.00	2.9	97.1	92.0
20	0.850	38.00	6.4	93.6	88.6
40	0.425	58.2	9.8	90.2	85.4
60	0.250	75.5	12.7	87.3	82.7
100	0.150	97.2	16.3	83.7	79.3
200	0.075	122.0	20.5	79.5	75.3
P.A.N	—	122.1			50-100

000215

% FINER = 100 - Σ % RETAINED



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase one II

MATERIAL TYPE: Clay Liner

PROJECT NO.: GQ0409 TASK NO.: 04-1

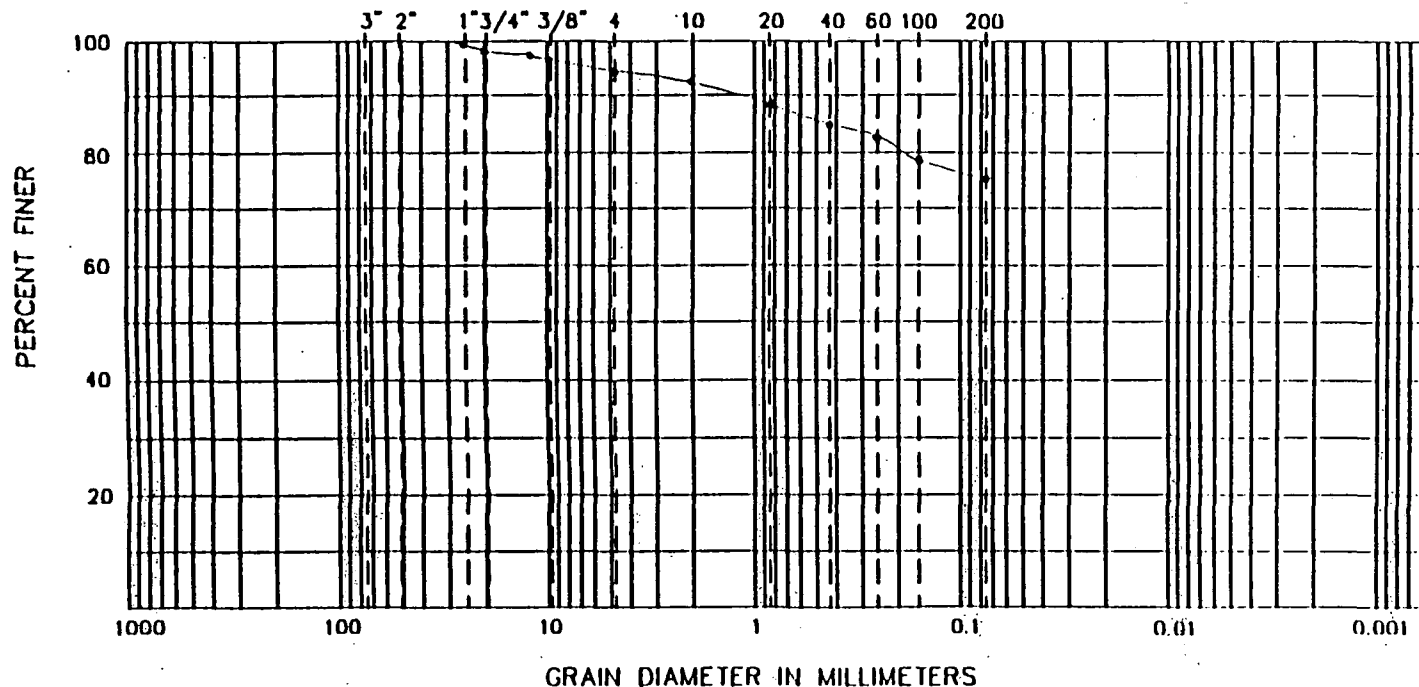
DATE: 2 day Sept month 1998 year

SAMPLE NO.: LPII-107 QA ID: CL
117

CURVE COEFFICIENTS: (C_u) (C_c)

BOULDERS	COBBLES	GRAVEL		SAND			FINE	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

U.S. STANDARD SIEVE SIZES



ATTERBERG LIMITS

(LL)

(PL)

(PI)

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100.0
2-in.	100.0
1 1/2-in.	100.0
1-in.	99.9
3/4-in.	99.0
1/2-in.	97.8
3/8-in.	96.8
NO. 4	94.7
NO. 10	92.0
NO. 20	88.6
NO. 40	85.4
NO. 60	82.7
NO. 100	79.3
NO. 200	75.3

HYDROMETER RESULTS

PARTICLE DIA.	% FINER

SOIL CLASSIFICATION (ASTM D 2487): _____

0000216



GEO SYNTEC CONSULTANTS
Geomechanics and Environmental Laboratory
Atlanta, Georgia

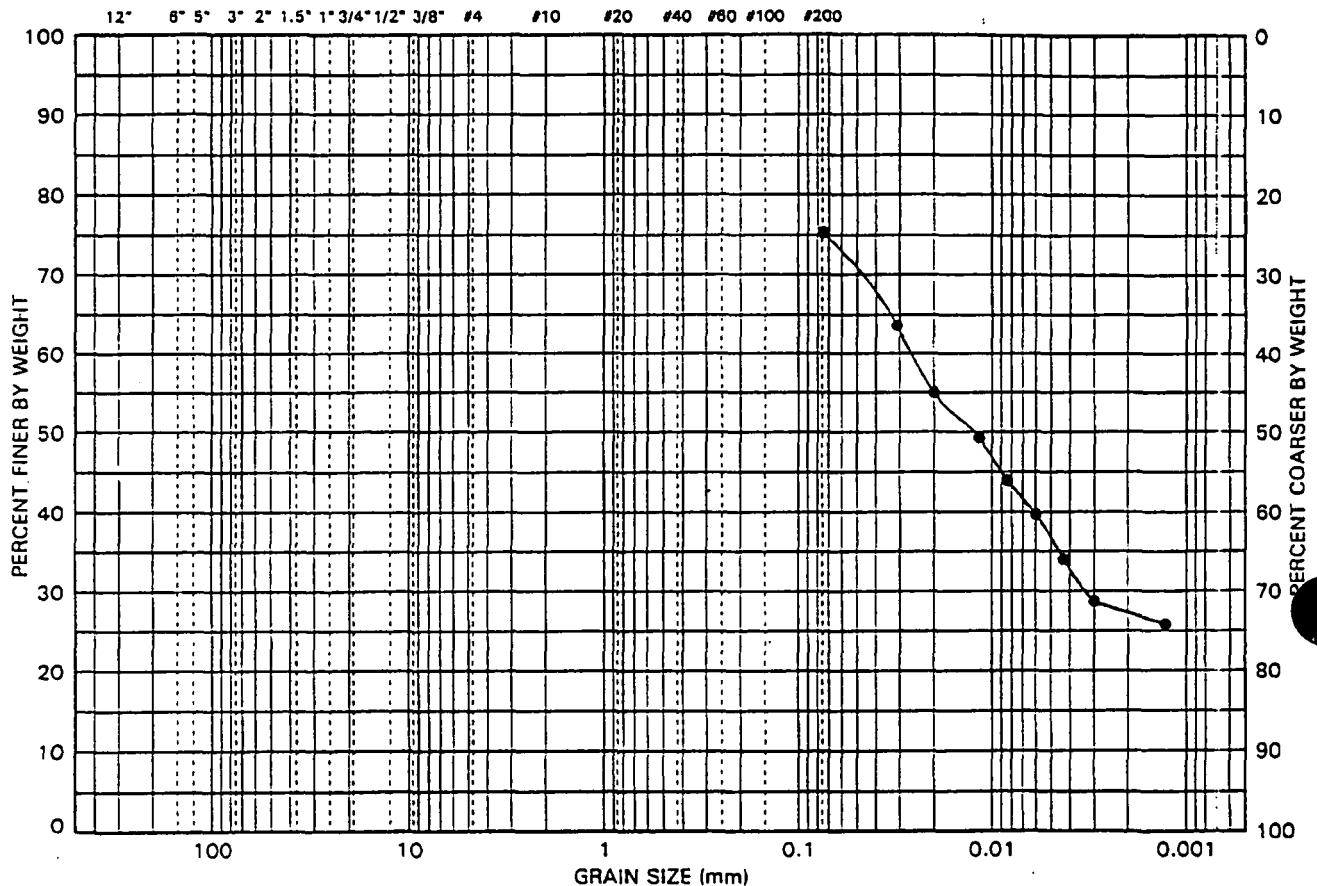
FIGURE

PROJECT: OSDF-Phase II
PROJECT NO.: GQ0409
DOCUMENT NO.:

GS FORM:
4PS2 09/08/98

PARTICLE SIZE DISTRIBUTION AND PHYSICAL PROPERTIES

ASTM C 136, D 422, D 2487
D 3042 AND D 4318

U.S. STANDARD SIEVE SIZES AND NUMBERS

SOILS	COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
		GRAVEL		SAND			FINES	

SITE SAMPLE ID LP-II-117

LIQUID LIMIT (%)

LAB. SAMPLE NO. 98H308

PLASTIC LIMIT (%)

SAMPLE DEPTH (ft)

PLASTICITY INDEX

SOIL CLASSIFICATION:

SOIL FRACTIONS	GRAVEL (%)	
	SAND (%)	
	FINES (%)	75.3
	SILT (%)	48.0
	CLAY (%)	27.3
COEFF. UNIFORMITY (Cu)		
COEFF. CURVATURE (Cc)		

PERCENT PASSING U.S. STANDARD SIEVE SIZES AND NUMBERS

3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#20	#40	#60	#100	#200
75	50	37.5	25	19	12.5	9.5	4.75	2.00	0.850	0.425	0.250	0.150	0.075

PERCENT PASSING SIEVE SIZES (mm)

PERCENT FINER**THAN HYDROMETER****PARTICLE DIAMETER (mm)**

0.050	0.020	0.005	0.002	0.001
75	70	55	37	27

NOTES:

000217



GEOSYNTEC CONSULTANTS

2064

FLUOR DANIEL
FERNALD

MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

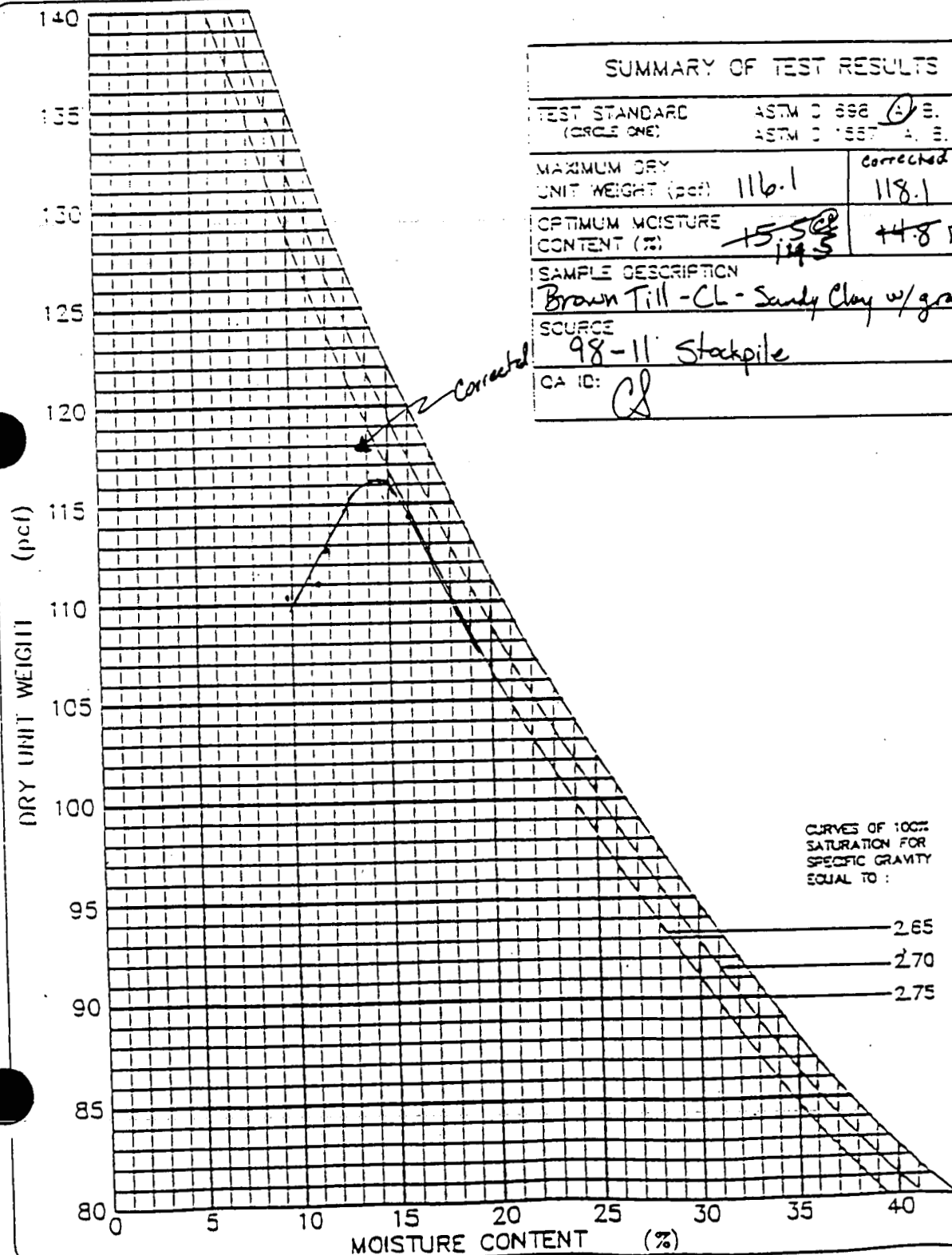
PROJECT NO: G00409 TASK NO.: 04.1

DESCRIPTION: Phase one II

DATE: 1 day Sept month 1998 year

MATERIAL TYPE: Clay Liner

SAMPLE NO.: LPII-117



000218



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD A)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04.

DESCRIPTION: Phase ~~one~~ II

DATE: 31 day Aug month 1998 year

MATERIAL TYPE: Clay Liner

SAMPLE NO.: LP II-119

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, AND IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS LESS THAN 20%. ALL MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS DISCARDED. USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 471B. USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: 225

	WATER ADDED	(ml)	6%	8%	10%	4%	12%
A	WT. OF SOIL & MOLD	(grams)	6123.6	6082.8	6218.9	6042.0	6173.5
B	WT. OF MOLD	(grams)	4209.4	4209.4	4209.4	4209.4	4209.4
C	WT. OF SOIL = A - B	(grams)	1914.2	1873.4	2009.5	1832.6	1964.1
D	WET UNIT WT. ⁽¹⁾ = C X 0.066	(pcf)	126.3	123.6	132.6	121.0	129.6
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	112.9	111.0	114.3	110.3	109.4

NOTE: IF CALIBRATED MOLD OF 1/30 FT³ IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT³ ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: 225

	TARE NO.		22	23	26	25	29
F	WT. OF TARE	(grams)	8.34	8.41	8.32	8.25	8.24
G	WT. OF WET SOIL & TARE	(grams)	210.30	155.47	202.44	172.68	196.60
H	WT. OF DRY SOIL & TARE	(grams)	188.9	140.4	175.6	158.1	167.2
I	WT. OF WATER = G - H	(grams)	21.5	15.1	26.8	14.6	29.4
J	WT. DRY SOIL = H - F	(grams)	180.6	132.0	167.3	149.9	159.0
K	MOISTURE CONTENT = (I/J) X 100	(%)	11.9	11.4	16.0	9.8	18.5

000219



GEO SYNTec CONSULTANTS

FLUOR DANIEL
FERNALD CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS
CONTAINING OVERSIZE PARTICLES

2064

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, CHIC

PROJECT NO: 300439 TEST NO: 04.1

DESCRIPTION: Phase ~~ONE~~ II

DATE: 1 day Sept month 1991 year

MATERIAL TYPE: Clay Liner

SAMPLE NO: LPII-117

Weight of Total Sample	=	56.65 lb
Weight of Oversize Fraction	=	3.0
Weight of Finer Fraction (-4)	=	@ 56.53.65
Percentage of Oversize Fraction	= (P _C)	5.3
Percentage of Finer Fraction (-4)	= (P _F)	94.7
Specific Gravity (Assumed)	= (G _M)	2.72

(W _F)	=	Water Content +, as decimal	=	0.155
(W _C)	=	Water Content +, as decimal	=	0.015
(δ _F)	=	Dry Density of finer fraction	=	116.1
(δ _w)	=	Unit Weight of Water	=	62.4

$$C_w = (W_F P_F) + (W_C P_C)$$

$$C_w = \overset{0.145}{(0.155)}(94.7) + (5.3)(0.015)$$

$$C_w = \overset{C1}{14.8\%} \quad 13.8\%$$

$$C\delta_D = 100\delta_F G_M \delta_w / (\delta_F P_C) + (G_M \delta_w P_F)$$

$$C\delta_D = \frac{100 (116.1) (2.72) (62.4)}{(116.1) (5.3) + (2.72) (62.4) (94.7)}$$

$$C\delta_D = 118.1$$

000220



GeoSyntec Consultants

Page 1 of 1

CONSTRUCTION NONCONFORMANCE REPORT

ORIGINATOR: <i>Collin P. Sukow</i>	TITLE/ORGANIZATION: <i>Site CQC Manager/GeoSyntec</i>	NCR NUMBER: <i>20102-007</i>	DATE DISCOVERED: <i>2 Sept. 1998</i>
RESPONSIBLE ORGANIZATION/PROJECT: <i>GeoSyntec Consultants/OSDF Phase II</i>		ASSESSMENT ACTIVITY: <i>Construction Quality Control</i>	HOLD TAG: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
			REMOVED (Initial/Date):

REQUIREMENTS (Identify requirement from document (e.g., CQA plan, specification, drawing, etc.):

Part 3.03.A, Section 02225 requires the moisture content and dry density of clay liner and cap material placed to be within the acceptable permeability zone (APZ), which is based on three criteria including "... (ii) moisture content not greater than 3 percentage points wet of the standard proctor optimum moisture content (ASTM D698).

NONCONFORMANCE TYPE: Construction Nonconformance ☒ Material Deviation ()

NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required):

On the Field Nuclear Density/Moisture Test logs dated 27 Aug., 28 Aug., 31 Aug., and 1 Sept. 1998 for compacted clay liner, Test Nos. 2-293, 2-305, 2-306, 2-307, 2-310, 2-317, 2-333, 2-335, 2-338 had field moisture contents greater than the limit of 3 percentage points wet of the standard Proctor optimum moisture content, thereby falling outside the APZ. These tests should have been declared as failed tests, and retests should have been conducted in accordance with the specifications.

ORIGINATOR'S SIGNATURE:

Collin P. Sukow

DATE PROVIDED TO RESPONSIBLE MANAGER:

9 Sept. 1998

RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION:

Use As-Is ☒

Reject ()

Other ☒

Repair ()

Rework ()

The Test Nos. listed above had field moisture contents of 19.9%, 20.4%, 19.5%, 20.3%, 19.9%, 20.0%, 19.2%, 20.3%, 19.7% in order, as listed above. The representative stockpile standard Proctor optimum moisture content used for the APZ was obtained by averaging the results from three tests on Stockpile 98-9, resulting in a value of 16.1%. The field moisture contents also included a 1.2% moisture correction based on a linear regression curve calculated from nuclear density and oven moisture contents. The areas where the field tests were conducted were closely monitored by GeoSyntec CQC and found to be well compacted with

RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION):

Daniel Bodine Project Manager GeoSyntec

RESPONSIBLE MANAGER'S SIGNATURE:

Daniel Bodine, P.E.

PROPOSED COMPLETION DATE:

9-10-98

DATE FORWARDED TO APPROVAL AUTHORITY:

9-10-98



GeoSyntec Consultants

2064

CONSTRUCTION NONCONFORMANCE REPORT

EVALUATION OF PROPOSED CORRECTIVE ACTION:
Comments ()Accept ☒

Reject ()

Accept as is with item 14 and attached information.

APPROVAL AUTHORITY SIGNATURE:

DATE:

John Burt For Jim Jenkins

9-11-98

VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):

See attached additional information.

VERIFIER'S SIGNATURE:

DATE:

John Burt

9-11-98

APPROVAL AUTHORITY SIGNATURE:

DATE CLOSED:

Dana Bork

9-11-98

CONTINUATION FROM BLOCK 14:

95.0%, 95.2%, 95.0%, 95.2%, 95.1%, 95.5%, 96.6%, 95.3%, and 96.7% compaction of the maximum density. Since the tests meet the other criteria of the APZ, and visual observation indicated good compaction, GeoSyntec CQC considers them as acceptable, use as is.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Overview

This document has been prepared to address the request for additional information (RAI) by FDF Engineering on GeoSyntec's NCR Nos. 20102-002, 20102-004 and 20102-007. These NCRs relate to field-measured moisture contents (FMCs) of compacted clay liner material that exceeded the limit of 3 percentage points wet of standard Proctor optimum moisture content (OMC) per Part 3.03.A, Section 02225 of the Technical Specification. Since this issue affects several field test results, thereby requiring additional NCRs, GeoSyntec has prepared this response to collectively address all FMC values that exceed the limit of 3% above OMC.

The RAI by FDF Engineering is presented in Blocks 22 and 27 of NCR No. 20102-002. Each comment is reproduced verbatim in italics followed by GeoSyntec's response.

RAI No. 1

"...GeoSyntec agreed to look at the moisture correction factor closely and evaluate the effect on the Field Measured Moistor (sic) Content of 16.8% whic (sic) is outlying the APZ window by 0.5%..."

GeoSyntec's Response to RAI No.1

As explained in NCR No. 20102-002 – Block 14, Test Nos. 2-93 and 2-94 had a FMC of 16.8% which included a 2% moisture correction from nuclear gauge to oven moisture content, based on Phase I test data. During Phase I construction, it was found that this 2% moisture correction was representative of the range of moisture contents encountered. The data from Phase I construction has been re-plotted in the attached Figure 1. The best-fit linear regression line is also shown on Figure 1. Interpolation of Figure 1 with a nuclear gauge moisture content of 14.8% results in an oven moisture content of approximately 16.5%, which is not much different from the 16.8% previously used. This confirms that the use of a 2% moisture correction, at least for Phase I construction, is justifiable.

The up-to-date moisture correction data for Phase II construction is presented in Figure 2. Using the best-fit linear regression equation or line from Figure 2 gives an oven moisture content of 15.5% for Test Nos. 2-93 and 2-94. The representative stockpile standard Proctor OMC used for the APZ is 13.3% (average of two tests for stockpile 98-3). Thus the correct FMC value of 15.5 would result in 2.2% above the OMC, and thereby meet the APZ requirement. Therefore, both tests that were initially considered failed tests did indeed passed if the Phase II moisture correction data is used.

GeoSyntec has repeatedly explained that the areas where field tests slightly exceeded the 3% limit of OMC were always closely monitored by the CQC personnel and found to be well compacted with no traffickability problems from the compactor or dozer. This is because the representative stockpile OMC value used to evaluate field compaction is generally obtained from averaging two or more standard Proctor compaction tests. This average value neglects the variability in the measured values. An example is presented below for illustration purposes.

Stockpile 98-9 had three samples taken for laboratory testing. The OMC and MDD values from the three tests are (see NCR No. FY98-1556 Block 21): 17.3% and 112.7 pcf (Sample No. LPII-93); 13.8% and 116.7 pcf (Sample No. LPII-94); and 17.1% and 110.8 pcf (Sample No. LPII-97). The representative stockpile OMC and MDD values obtained by averaging the three tests are 16.1% and 113.4 pcf, respectively. Field compaction Test No. 2-279, for example, had a FMC = 18.9% which happened to meet the 3% limit of OMC with the value of 16.1%. GeoSyntec CQC took samples of the clay liner material from the test location, during the re-tests of 1 September 1998, and conducted a one-point compaction test. Test results (attached for Sample No. LPII-127) indicate a moisture content of 15.3% and dry density of 112.2 pcf. When compared with the three standard Proctor compaction test curves, this one-point test falls closely to the LPII-93 sample, which had an OMC of 17.3% (see attached results). This implies that field compaction Test No. LPII-279 could have had a FMC of 20.3% and passed the APZ criteria if only one sample test results was used. It is therefore evident that the averaging process, without accounting for the variability of test samples do indeed affect the evaluation of field compaction. Therefore, one should not solely rely on numbers to pass or fail field compaction tests. The clay soils for the OSDF project are no different from other naturally occurring clays, which have inherent and spatial variability. Geotechnical field experience should always be included in the decision making process.

RAI No. 2

"...Provide Hydraulic Conductivity test result..."

GeoSyntec's Response to RAI No. 2

Samples No. LPII-26 and LPII-36 from stockpile 98-3 used in the field Test Nos. 2-93 and 2-94 had laboratory-measured hydraulic conductivity values of 1.3×10^{-8} cm/s and 7.5×10^{-8} cm/s, respectively. These tests were conducted slightly below the limit of 3% above OMC. However, at higher moisture contents, hydraulic conductivity would definitely be lower than the above-reported values.

RAI No. 3

"... What shear strengths have we found with similar moisture contents on soils with a simillar (sic) proctor? How do these shear strengths affect slope stability?"

GeoSyntec's Response to RAI No. 3

The slope stability analyses of the OSDF are presented in the Final Design Calculation Package (GeoSyntec, 1996). In the analyses, shear strength parameters for the compacted clay liner were developed from tests performed on remolded samples of the on-site brown till material, which is being used for Phase II construction. The test data are presented in two reports prepared by Parson (1995, 1996). The conservative shear strength parameters used in the analyses are: $\phi_u = 0$ degrees; and $C_u = 500$ psf (for short-term (undrained) conditions); and $\phi_d = 25$ degrees, and $C_d = 0$ psf (for long-term (drained) conditions). These values were obtained by assuming that the compacted clay will be placed at 95 to 98 percent relative compaction (i.e., 0 to 3% above OMC).

A review of the test data performed by Parsons indicate that some of the samples were remolded more than 3% above OMC. One sample, for example, with an OMC of 14.5% and remolded moisture content of 18.2 % had the following shear strength values: $\phi_u = 27$ degrees; and $C_u = 125$ psf (for short-term (undrained) conditions); and $\phi_d = 30$ degrees, and $C_d = 250$ psf (for long-term (drained) conditions). Even at 3.7% above OMC, the measured shear strength values definitely exceed the design values.

RAI No. 4

"...What is the % saturation for these samples? How would this saturation improve permeability? What would be the associated permeability?"

Response to RAI No.4

Test Nos. 2-93 and 2-94 had field measured dry density of 115.2 pcf and 114.9 pcf, respectively. The field-measured moisture content is 16.8%. Using a specific gravity of 2.72, which has been found from laboratory tests to be a representative value, the percent degree of saturation values are 96.5% and 95.8%, respectively, for Test Nos. 2-93 and 2-94. At degree of saturations greater than 95%, the compacted clay would have lower hydraulic conductivity. It should also be noted that the left boundary of the APZ is at a 90% degree of saturation.

GeoSyntec's Concluding Response

NCR Nos. 20102-002, 20102-004 and 20102-007 were written by GeoSyntec to document the moisture variance with respect to specification requirements. Our field and lab testing procedures involve averaging stockpile Proctor results, applying moisture corrections to the nuclear densometer moisture, obtaining additional oven dry moisture samples, and observing field placement and compaction conditions before evaluating the acceptability of the compacted lift. GeoSyntec evaluated the fill and considered the fill and field tests acceptable. Our recommendation and conclusion is use-as-is. For future use a design change notice is being prepared to address the upper moisture limit of 3% above OMC.

Kwasi Badu-Tweneboah, Ph.D., P.E.

Resident Engineer

Ohio Registration No. E-55354

Daniel G. Bodine 10 Sep 98

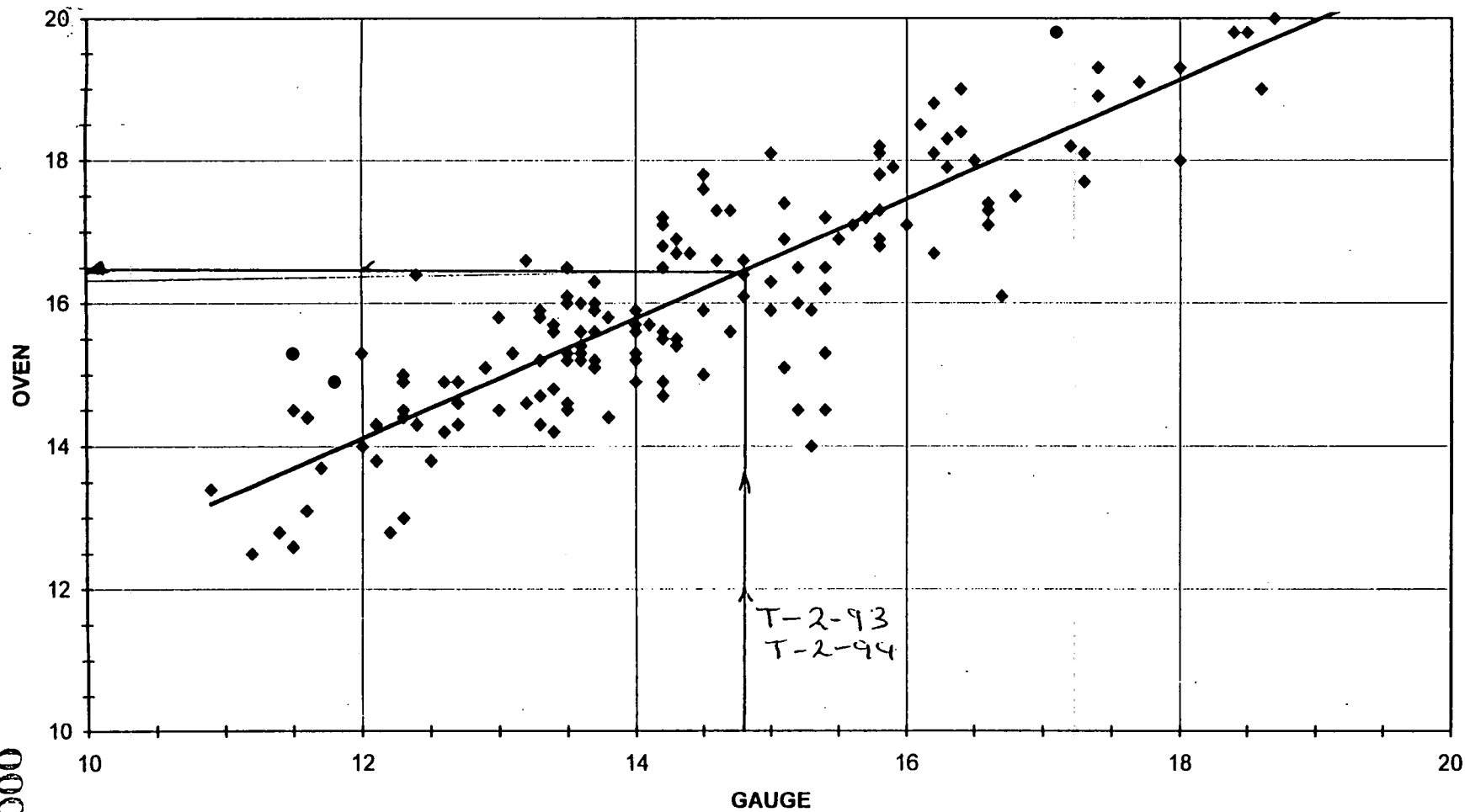
Daniel G. Bodine, P.E.

Managing/Certifying Engineer

Ohio Registration No. E-61363

Figure 1. PHASE I DATA

MOISTURE ADJUSTMENT



000226

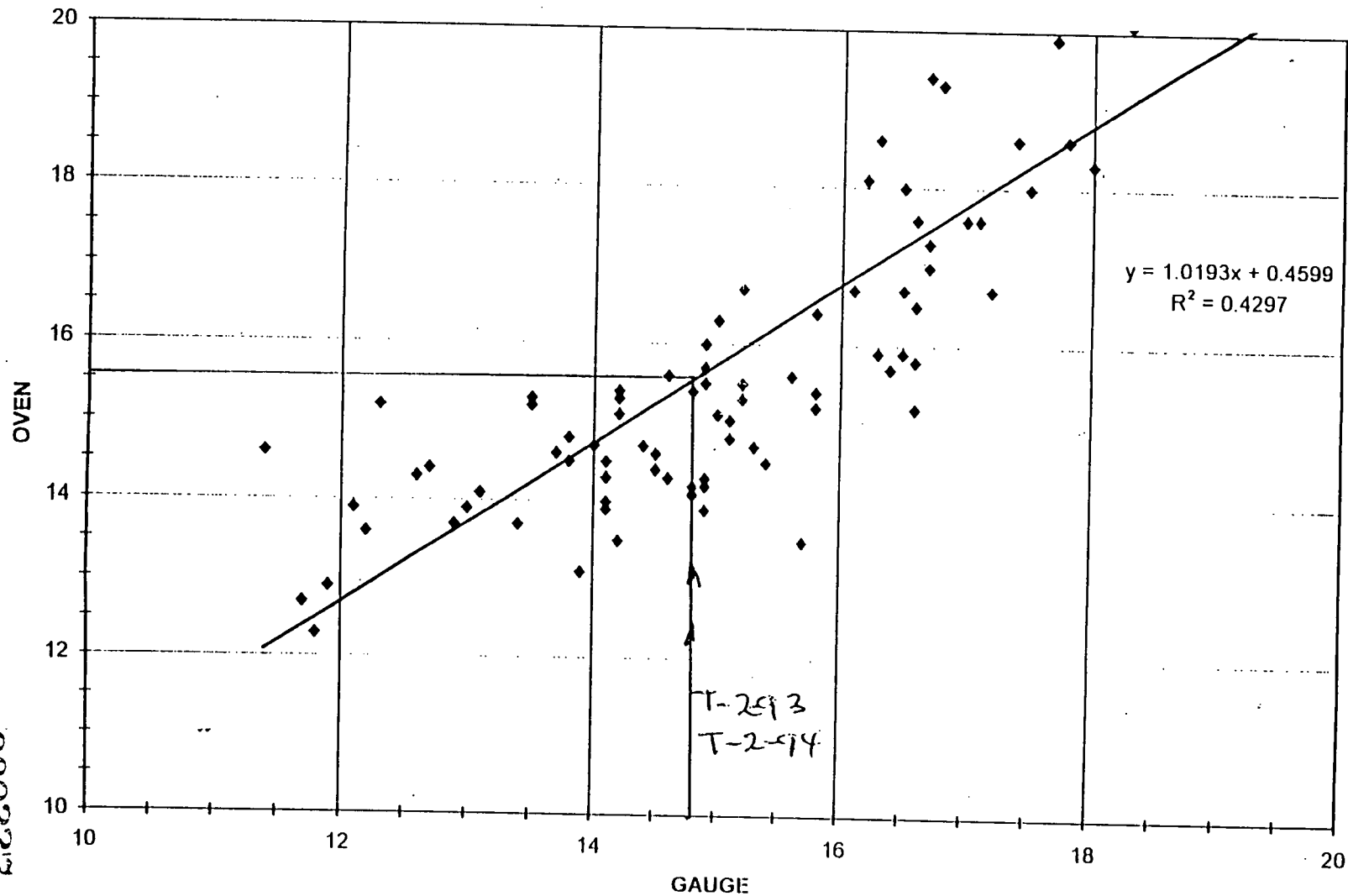
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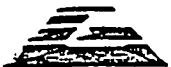
2064

Figure 2. PHASE II DATA

Chart3

MOISTURE ADJUSTMENT





CONSTRUCTION NONCONFORMANCE REPORT

ORIGINATOR: <i>Collin P. Sukow</i>	TITLE/ORGANIZATION: <i>CQC Site Manager/GeoSyntec</i>	NCR NUMBER: <i>20102-008</i>	DATE DISCOVERED: <i>10 Aug. 1998</i>
RESPONSIBLE ORGANIZATION/PROJECT: <i>GeoSyntec Consultants/OSDF Phase II</i>		ASSESSMENT ACTIVITY: <i>Construction quality control</i>	HOLD TAG: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO REMOVED (Initial/Date):
REQUIREMENTS (Identify requirement from document (e.g., CQA plan, specification, drawing, etc.)): <i>CQA PLAN: PAGE 6-5, section 6.6.1</i> <i>"In-place surface moisture/density nuclear tests methods (ASTM D 3017 and D 2922) shall be used for in-situ field testing. The sand cone method (ASTM D 1556) shall be used to establish correlations of moisture and density in cases of uncertainty, and as a check of the nuclear surface moisture/density gauge calibration."</i>			
NONCONFORMANCE TYPE: <input checked="" type="checkbox"/> Construction Nonconformance <input type="checkbox"/> Material Deviation			
NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required): <i>During the construction of the cell #2 clay liner, The sand cone method (ASTM D 1556) was not used. Instead, The drive tube method (ASTM D 2937) was used for the moisture/density correlation to the nuclear moisture/density gauge readings.</i>			
ORIGINATOR'S SIGNATURE: <i>Collin P. Sukow</i>		DATE PROVIDED TO RESPONSIBLE MANAGER: <i>9 Sept. 1998</i>	
RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION:		Use As-Is (<input checked="" type="checkbox"/>) Reject (<input type="checkbox"/> Repair (<input type="checkbox"/>) Rework (<input type="checkbox"/> <i>The drive tube method for in-place moisture/density testing uses a calibrated steel tube of known volume to remove a test specimen for the determination of wet density. The sand cone method also involves the removal of in-place soil and relies on calibrated density sand for the determination of the volume of the hole from which the in-place soil was removed. Both methods use the same test methods for the determination of moisture content, in this case the oven method (ASTM D 2216) was used. A summary of the drive tube data and nuclear density data is attached, use-as-is.</i>	
RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION): <i>Daniel Brulow Project Manager GeoSyntec</i>			
RESPONSIBLE MANAGER'S SIGNATURE: <i>Daniel Brulow, P.E.</i>		PROPOSED COMPLETION DATE: <i>10 Sept 1998</i>	DATE FORWARDED TO APPROVAL AUTHORITY: <i>10 Sept. 1998</i>



GeoSyntec Consultants

20102-008

Page 2 of 3

CONSTRUCTION NONCONFORMANCE REPORT

EVALUATION OF PROPOSED CORRECTIVE ACTION: Comments ()		Accept <input checked="" type="checkbox"/>	Reject ()
APPROVAL AUTHORITY SIGNATURE: <i>James C. Jenkins</i>		DATE: 9/11/98	
VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where): <i>See line 14</i>			
VERIFIER'S SIGNATURE: <i>James C. Jenkins</i>		DATE: 9/11/98	
APPROVAL AUTHORITY SIGNATURE: <i>Daniel Bodero</i>		DATE CLOSED: 9/11/98	
CONTINUATION FROM BLOCK ____			

2064

FIELD DENSITY TESTS (F.D.T.) DRIVE TUBE (D.T.)		WET DENSITY	% MOISTURE
F.D.T.	23	133.5	16.6
D.T.	24	134.1	16.5
F.D.T.	55	136.0	15.8
D.T.	58	134.9	15.2
F.D.T.	74	135.4	14.2
D.T.	75	135.0	15.3
F.D.T.	100	134.3	13.5
D.T.	101	136.0	15.3
F.D.T.	127	134.7	14.1
D.T.	128	135.3	14.5
F.D.T.	154	136.0	12.6
D.T.	155	138.0	14.3
F.D.T.	179	135.9	14.5
D.T.	180	135.3	14.6
F.D.T.	184	135.9	14.9
D.T.	185	134.2	14.2
F.D.T.	190	135.2	15.2
D.T.	191	134.2	15.5
F.D.T.	194	136.9	14.2
D.T.	195	134.4	15.4
F.D.T.	236	135.8	14.7
D.T.	237	134.8	15.0
F.D.T.	277	128.3	18.3
D.T.	282	129.2	20.1
F.D.T.	278	131.8	16.7
D.T.	283	134.2	17.0
F.D.T.	332	129.3	20.7
D.T.	339	128.9	19.7
F.D.T.	333	130.7	18.0
D.T.	340	131.0	18.3

RCI/DCN FORM

Info only

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1) WP / WO NO.: 20102		(2) S/C NO.: FSC-614		(5) Pg 1 OF 1	(6) DATE 9 Sept. 98
(3) S/C TITLE: OSDF Phase II				(11) RCI NO.:	
(4) RESPONSIBLE DISCIPLINE: E <input type="checkbox"/> M <input type="checkbox"/> C <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		(4A) RCI/DCN TITLE: Nuclear Density Correlation CQA Plan		(11) DCN NO.: 20102-057	
(7) DOCUMENTS AFFECTED		(7) DOCUMENT NOS.	(7) REV	(8) OTHER	
Construction Quality Assurance Plan (20100-PL-006)		Pages 4-10, 6-5, 6-14 and 6-15	0		
(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER			(9) DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE		
<p>A change to the CQA Plan is being made to the requirements for the density correlation test which will allow the use of the drive cylinder test method (ASTM D 2937) or the sand cone test method (ASTM D 1556). Currently, the sand cone test method is only allowed. The drive cylinder test is an acceptable correlation test method and will likely be used more often than the sand cone method due to the occurrence of less gravel in the clay borrow material.</p> <p>Make the following changes to the CQA Plan:</p> <p>Page 4-10, Section 4.4.3 - Rewrite the last bullet item as follows: "sand cone (ASTM D 1556) or drive cylinder (2937)."</p> <p>Page 6-5, Section 6.6.1 - Rewrite the third sentence in the last paragraph as follows: "The sand cone test method (ASTM D 1556) or drive cylinder test method (ASTM D 2937) shall be used to establish correlations of moisture and density in cases of uncertainty and as a check of the nuclear surface moisture/density gauge calibration."</p> <p>Page 6-14 and 6-5, Tables 6-3 and 6-4, respectively. Rewrite the last test method description as follows: "Sand Cone/ASTM D 1556 or Drive Cylinder/ASTM D 2937"</p>					
(10) REQUESTOR: <i>Daniel Bodine</i> Daniel Bodine		COMPANY: GeoSyntec	DATE: 9 Sept. 1998	(12) CE / PE DATE:	
(13) RESPONSE: FOR RCI, IS A DCN REQ'D? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES (14) FOR DCN: <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED AS NOTED <input type="checkbox"/> DISAPPROVED					
RCI - DCN ACCEPTANCE					
(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: <i>Daniel Bodine</i> Daniel Bodine 9 Sept. 1998 <input type="checkbox"/> FIT <input checked="" type="checkbox"/> FORM <input type="checkbox"/> FUNCTION			(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:		
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)					DATE:
(17) PERFORMANCE GRADE:					
(18) CONSTRUCTION CONCURRENCE:		DATE:	(21) WORK COMPLETED: (SIGNOFF BY CE OR PE)		DATE:
(19) PURCHASE REQUISITION REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					

000231



GeoSyntec Consultants

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CONSTRUCTION NONCONFORMANCE REPORT

ORIGINATOR: <i>Daniel Bodine</i>	TITLE/ORGANIZATION: <i>Project Manager/GeoSyntec</i>	NCR NUMBER: <i>20102-009</i>	DATE DISCOVERED: <i>9 Sept. 1998</i>
RESPONSIBLE ORGANIZATION/PROJECT: <i>FDF / OSD Phase II P.O. 98-SC002317 & GeoSyntec Consultants</i>	ASSESSMENT ACTIVITY: <i>Resident Engineering & Construction Quality Control</i>	HOLD TAG: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	REMOVED (Initial/Date):
REQUIREMENTS (Identify requirement from document (e.g., CQA plan, specification, drawing, etc.)): <i>Part 2.01.G of Specification 02770 P requires geomembrane to be manufactured in lots of at least 100,000 sq ft, unless a smaller quantity is approved by FDF. Table 7-1 of Construction Quality Assurance Plan (PL-006) requires Geomembrane Conformance Testing be performed at a frequency of one per lot or at frequency listed in table, whichever is greater.</i>			
NONCONFORMANCE TYPE: <input checked="" type="checkbox"/> Construction Nonconformance <input type="checkbox"/> Material Deviation ()			
NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required): <i>Five (5) rolls (Nos. AK 2527, AK 2528, AK 2550, AK 2553, AK 2554) from Resin Lot No. 2-45448 and one (1) roll (No. AJ-5175FF) from Resin Lot No. 2-45934 were delivered to the site. FDF has not provided to GeoSyntec their written acceptance or approval of the smaller lots and at the time of conformance test sampling, before shipment, these rolls were not scheduled or approved for this project. Therefore, conformance test sampling of these lots has not been performed or authorized.</i>			
ORIGINATOR'S SIGNATURE: <i>Daniel Bodine</i>		DATE PROVIDED TO RESPONSIBLE MANAGER: <i>10 Sept 98</i>	
RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION: Use As-Is () Reject () Other: <input checked="" type="checkbox"/> Repair () Rework () <i>FDF provide written approval and acceptance of smaller lots and written authorization to sample and test smaller lots for conformance testing. FDF also to provide any additional manufacturers quality control testing per frequency requirements, if necessary. Hold tags shall be placed on all affected rolls until testing is complete and NCR corrective action is approved and verified.</i>			
RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION): <i>Daniel Bodine Project Manager GeoSyntec</i>			
RESPONSIBLE MANAGER'S SIGNATURE: <i>Daniel Bodine P.E.</i>	PROPOSED COMPLETION DATE: <i>30 Sept 98</i>	DATE FORWARDED TO APPROVAL AUTHORITY: <i>10 Sept 98</i>	



GeoSyntec Consultants

20102-009
Page 2 of 2

CONSTRUCTION NONCONFORMANCE REPORT

EVALUATION OF PROPOSED CORRECTIVE ACTION:
Comments ()Accept ☒

Reject ()

FDF GIVES AUTHORIZATION; THE REJECTED ROLLS ARE NEEDED AND SHALL BE SAMPLED BY THE CQC CONSULTANT & TESTED IN THEIR LABORATORY.

APPROVAL AUTHORITY SIGNATURE:

DATE:

9/17/98

VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):

FDF Provided acceptance of the smaller lots and authorization to sample and test conformance samples by the evaluation and signature above. CQC sampled and tested conformance samples from GML Roll Nos. AK 2528 and AJ 5175, have been tested and results meet minimum specification requirements. Results are attached. In addition FDF has now submitted

VERIFIER'S SIGNATURE:

DATE:

20 Oct. 98

APPROVAL AUTHORITY SIGNATURE:

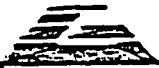
DATE CLOSED:

20 Oct. 98

CONTINUATION FROM BLOCK 22

The required resin certification sheet for Lot No. Y 45934 (Submittal No. 005 Rev 2). Results were reviewed by GeoSyntec and found to be acceptable. Results are attached.

000233



CONSTRUCTION NONCONFORMANCE REPORT

ORIGINATOR: <i>Collin Sukow</i>	TITLE/ORGANIZATION: <i>QC Site Manager/GeoSyntec</i>	NCR NUMBER: <i>20102-010</i> <i>011</i>	DATE DISCOVERED: <i>9 Sept. 1998</i>
RESPONSIBLE ORGANIZATION/PROJECT: <i>GeoSyntec Consultants</i> <i>Hydro Environmental Technologies</i> <i>RE 7/29/98</i>		ASSESSMENT ACTIVITY: <i>Construction Quality Control</i>	HOLD TAG: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO REMOVED Initial Date:
REQUIREMENTS (Identify requirement from document (e.g., CQA plan, specification, drawing, etc.): <i>FROM THE TECHNICAL SPECIFICATIONS, PHASE II, 02710-2, 3, PART 2.01 B. This paragraph states that the granular drainage material of the leachate collection and detention system must meet the gradation requirements (ASTM C-136) as listed on the table included in this section.</i>			
NONCONFORMANCE TYPE: <input checked="" type="checkbox"/> Construction Nonconformance <input type="checkbox"/> Material Deviation ()			
NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required): <i>Seven samples were taken from the granular drainage material stockpiles for sieve analysis. Two of the sieve samples failed the project specifications with approximately 70% passing the 1/2-in sieve. 02710, Part 2.01 B, requires a minimum of 80% passing the 1/2-in sieve.</i>			
ORIGINATOR'S SIGNATURE: <i>Collin F. Sukow</i>		DATE PROVIDED TO RESPONSIBLE MANAGER: <i>20 Sept. 1998</i>	
RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION:		Use As-Is <input checked="" type="checkbox"/> Reject () Other () Repair () Rework ()	
<i>The material is slightly coarser than specifications require. However, it does meet the maximum particle size requirement and does not increase the potential for damaged GML during placement. Being coarser, the material will have a higher hydraulic conductivity, which is desirable. Use as-is.</i>			
RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION): <i>Daniel Bodine</i> <i>Project Manager, GeoSyntec</i>			
RESPONSIBLE MANAGER'S SIGNATURE: <i>Daniel Bodine</i>		PROPOSED COMPLETION DATE: <i>25 Sept. 98</i>	DATE FORWARDED TO APPROVAL AUTHORITY: <i>22 Sept. 98</i>

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GeoSyntec Consultants

20102-011
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CONSTRUCTION NONCONFORMANCE REPORT

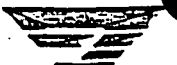
EVALUATION OF PROPOSED CORRECTIVE ACTION: Comments ()		Accept <input checked="" type="checkbox"/>	Reject ()
APPROVAL AUTHORITY SIGNATURE: <i>James C. Jenkins</i>		DATE: 9/23/98	
VERIFICATION OF CORRECTIVE ACTION (Describe who, when, where): <i>James C. Jenkins</i>			
VERIFIER'S SIGNATURE: <i>James C. Jenkins</i>		DATE: 9/23/98	
APPROVAL AUTHORITY SIGNATURE: <i>Daniel Bodine</i>		DATE CLOSED: 9/23/98	
CONTINUATION FROM BLOCK _____			

000235

ORIGINATOR: Collin Sukow TITLE/ORGANIZATION: COC MANAGER/GEOSYNTEC NCR NUMBER: 20103-012 DATE DISCOVERED: 26 SEPT 1998		RESPONSIBLE ORGANIZATION/PROJECT: PETRO ENVIRONMENTAL ASSESSMENT ACTIVITY: Construction Quality Control HOLD TAG: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO REMOVED (Initial Date):	
REQUIREMENTS (Identify requirement from document (e.g., UVA plan, specification, drawing, etc.)) 02770-10, PART 3, 1.0: PERFORM DESTRUCTIVE SEAM TESTS TO EVALUATE SEAM STRENGTH AND INTEGRITY. PERFORM DESTRUCTIVE TESTING AS THE SEAMING WORK PROGRESSES, NOT AT THE COMPLETION OF FIELD SEAMING. 02770-10, PART 3, 2.6: CUT SAMPLES AT THE LOCATIONS DESIGNATED BY THE CQC CONSULTANT AT THE TIME THE LOCATIONS ARE DESIGNATED. NUMBER EACH SAMPLE AND LOCATION. IMMEDIATELY REPAIR ALL HOLES IN THE GOMMEGRANITE RESULTING FROM THE DESTRUCTIVE SEAM SAMPLING.			
NONCONFORMANCE TYPE: <input checked="" type="checkbox"/> Construction Nonconformance <input type="checkbox"/> Material Deviation			
NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required): DEPLOYMENT OF GML CONTAINERS IN CELL #2 WITH DESTRUCTIVE SAMPLES NOT BEING REMOVED AND TESTED. THE DESTRUCTIVE SAMPLES THAT NEED TO BE TESTED INCLUDE DIS 16, 17, 18, 19, 20, 21, 22, 13-24, 13-28, 14A, 14B, 15, 16			
ORIGINATOR'S SIGNATURE: <i>Collin Sukow</i> DATE PROVIDED TO RESPONSIBLE MANAGER: 28 Sept 98		RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION: CUT OUT ALL DESTRUCTIVE SAMPLES MARKED SO THAT THEY CAN BE FIELD TESTED. EVALUATED, AND SENT OFF SITE FOR LABORATORY TESTING. REPAIR THE HOLES CREATED BY SAMPLING AND CAP STRIP ALL FAILING SEAMS IMMEDIATELY.	
RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION): Daniel G. Bodine RESPONSIBLE MANAGER'S SIGNATURE: <i>Daniel G. Bodine</i>		PROPOSED COMPLETION DATE: 29 Sept 98 DATE FORWARDED TO APPROVAL AUTHORITY: 28 Sept 98	

CONSTRUCTION NONCONFORMANCE REPORT

Geosyntec Consultants



2064



GeoSyntec Consultants

20102-012

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CONSTRUCTION NONCONFORMANCE REPORT

EVALUATION OF PROPOSED CORRECTIVE ACTION: Comments ()		Accept (<input checked="" type="checkbox"/>)	Reject ()
APPROVAL AUTHORITY SIGNATURE: <i>James C. Jenkins</i>		DATE: 9/28/98	
VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where). <i>All destructive samples listed were cut and removed for field and laboratory testing. The sample locations were repaired in accordance with 02770.3.02.K and completed in a timely manner. Failing destructive locations were tracked with before and after destructive locations until the failing seams were isolated and repaired in accordance with the S.O.P. Appendix C, 8.6.</i>			
VERIFIER'S SIGNATURE: <i>Colin J. Brown MA</i>		DATE: 19 Oct. 1998	
APPROVAL AUTHORITY SIGNATURE: <i>Daniel Boland</i>		DATE CLOSED: 20 Oct 1998	
CONTINUATION FROM BLOCK _____			



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CONSTRUCTION NONCONFORMANCE REPORT

1. ORIGINATOR: <i>Collin P. Sukow</i>	2. TITLE/ORGANIZATION: <i>CQC Manager / GeoSyntec</i>	3. NCR NUMBER: <i>20102-14</i>	4. DATE DISCOVERED: <i>31 October 1998</i>
5. RESPONSIBLE ORGANIZATION/PROJECT: <i>GeoSyntec Consultants</i>		6. ASSESSMENT ACTIVITY: <i>Construction Quality Control</i>	7. HOLD TAG: () YES (X) NO
		8. REMOVED (Initial/Date):	
9. REQUIREMENTS (Identify requirement from document (e.g., CQA plan, specification, drawing, etc.)): <i>PART 5, Section 7.8.9.6 of the OSDF Support plans states: "In cases exceeding 150 ft of reconstructed seam, a sample taken from the zone in which the seam has been reconstructed must pass destructive testing."</i>			
10. NONCONFORMANCE TYPE: Construction Nonconformance (X) Material Deviation ()			
11. NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required): <i>Seam S-37/S-44, S-40/S-44, and S-40/S-45 had one continuous reconstructed seam measuring 157 ft in length. No destructive sample was marked on this reconstructed seam (cap).</i>			
12. ORIGINATOR'S SIGNATURE: <i>Collin P. Sukow</i>		13. DATE PROVIDED TO RESPONSIBLE MANAGER: <i>4 November 1998</i>	
14. RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION:		15. Use As-Is (X) Reject () Other () Repair () Rework ()	
<i>The secondary liner system had two reconstructed seams measuring greater than 150-ft in length. The secondary GML also had numerous other smaller caps measuring from less than 10-ft to greater than 100 ft. Technically, only two destructive samples needed to be placed on reconstructed seams. However, the reconstructed seams were also counted on the seaming logs and added to the total welded seam lengths for the 500 ft linear ft frequency for destructive testing. This is more</i>			
16. RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION): <i>Collin P. Sukow, CQC Manager, GeoSyntec Consultants</i>			
17. RESPONSIBLE MANAGER'S SIGNATURE: <i>Collin P. Sukow</i>		18. PROPOSED COMPLETION DATE: <i>10 November 1998</i>	19. DATE FORWARDED TO APPROVAL AUTHORITY: <i>5 November 1998</i>



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20102-014
Page 2 of 2

CONSTRUCTION NONCONFORMANCE REPORT

EVALUATION OF PROPOSED CORRECTIVE ACTION:
Comments ()Accept (☒)

Reject ()

APPROVAL AUTHORITY SIGNATURE:

Daniel Brito, P.E., J. C. Jenkins 11/9/98

DATE:

7 Nov 1998

VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):

VERIFIER'S SIGNATURE:

Collin P. Lisle

DATE:

9 Nov 1998

APPROVAL AUTHORITY SIGNATURE:

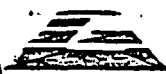
Daniel Brito

DATE CLOSED:

9 Nov 1998

CONTINUATION FROM BLOCK 14:

~~Strict~~ Stringent than the support plans call for and resulted in a total of 9 samples taken from reconstructed seams for destructive testing. Therefore, the deviation in sampling for destructive seam testing is not significant and no further action is needed.



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2064

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CONSTRUCTION NONCONFORMANCE REPORT

ORIGINATOR: <i>Collin Sukow</i>	TITLE/ORGANIZATION: <i>CQC Site Manager/GeoSyntec</i>	NCR NUMBER: <i>20102-015</i>	DATE DISCOVERED: <i>31 Oct 1998</i>
RESPONSIBLE ORGANIZATION/PROJECT: <i>GeoSyntec Consultants</i>		ASSESSMENT ACTIVITY: <i>Construction Quality Control</i>	HOLD TAG: () YES <input checked="" type="checkbox"/> NO
			REMOVED (Initial/Date):
REQUIREMENTS (Identify requirement from document (e.g., CQA plan, specification, drawing, etc.)): <p>Part 5, Section 7.8.9.6 of the OSDF support plans states: "All failed seams must be bounded by two locations from which samples passing laboratory destructive tests have been taken," and, "...the seam is reconstructed between these locations".</p>			
NONCONFORMANCE TYPE: Construction Nonconformance <input checked="" type="checkbox"/> Material Deviation ()			
NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required): <p>Destructive Sample D/S-17 failed laboratory testing. The seam was tracked and a 'before' sample passed laboratory testing. The 'after' sample failed field testing and the seam was reconstructed from the passing 'before' sample location to the end of the seam. The next seam took that machine (No 9860) welded should have had a destructive sample located within the first 10 ft of the seam and reconstructed to the beginning of the seam. D/S 28²⁷ was marked 164 ft into the seam and was not reconstructed to the beginning of the seam.</p>			
ORIGINATOR'S SIGNATURE: <i>Collin P. Sukow</i>		DATE PROVIDED TO RESPONSIBLE MANAGER: <i>4 November 1998</i>	
RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION: <div style="display: flex; justify-content: space-between;"> Use As-Is <input checked="" type="checkbox"/> Reject () Other () </div> <div style="display: flex; justify-content: space-between;"> Repair () Rework () </div> <p>The destructive sample D/S 27 passed laboratory testing. The seam D/S 27, was located on S-60/S-62, S-60/S-65..., passed non-destructive testing (i.e. air pressure test). The trial weld for machine no. 9860 prior to welding the seam passed the peel and shear test requirements. It is the CQC manager's opinion that the portion of seam not reconstructed back to the beginning of the weld is sound based on the test results for the three tests listed above. Use as-is.</p>			
RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION): <i>Collin P. Sukow, CQC Manager, GeoSyntec Consultants</i>			
RESPONSIBLE MANAGER'S SIGNATURE: <i>Collin P. Sukow</i>		PROPOSED COMPLETION DATE: <i>10 November 1998</i>	DATE FORWARDED TO APPROVAL AUTHORITY: <i>5 November 1998</i>

FIGURE 2



• GeoSyntec Consultants

20102-015

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CONSTRUCTION NONCONFORMANCE REPORT

EVALUATION OF PROPOSED CORRECTIVE ACTION: Comments ()		Accept <input checked="" type="checkbox"/>	Reject ()
APPROVAL AUTHORITY SIGNATURE: <i>Daniel Bodine, P.E., J.C. Jenkins</i>		DATE: <i>11/19/98</i> <i>7 November 1998</i>	
VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where)			
VERIFIER'S SIGNATURE: <i>Colin P. Skow</i>		DATE: <i>9 Nov 1998</i>	
APPROVAL AUTHORITY SIGNATURE: <i>Daniel Bodine</i>		DATE CLOSED: <i>9 Nov 1998</i>	
CONTINUATION FROM BLOCK _____			

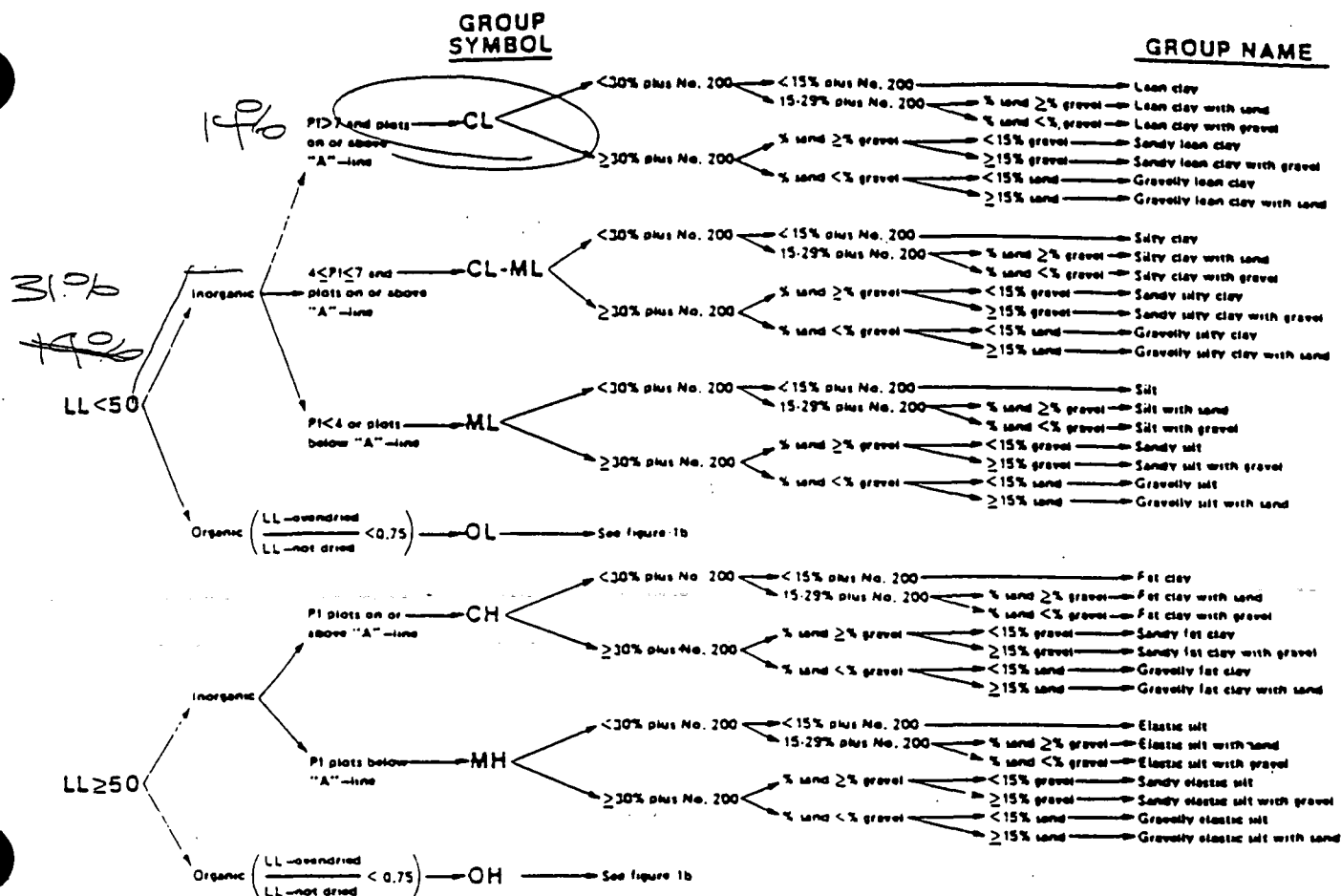


FIG. 1a Flow Chart for Classifying Fine-Grained Soil (50 % or More Passes No. 200 Sieve)

following sizes (with the largest size commensurate with the maximum particle size) with other sieve sizes as needed or required to define the particle-size distribution:

- 3-in. (75-mm)
- ¾-in. (19.0-mm)
- No. 4 (4.75-mm)
- No. 10 (2.00-mm)
- No. 40 (425-μm)
- No. 200 (75-μm)

9.8 The tests required to be performed in preparation for classification are as follows:

9.8.1 For soils estimated to contain less than 5 % fines, a plot of the cumulative particle-size distribution curve of the fraction coarser than the No. 200 (75-μm) sieve is required. The cumulative particle-size distribution curve may be plotted on a graph similar to that shown in Fig. 4.

9.8.2 For soils estimated to contain 5 to 15 % fines, a cumulative particle-size distribution curve, as described in 9.8.1, is required, and the liquid limit and plasticity index are required.

9.8.2.1 If sufficient material is not available to determine the liquid limit and plasticity index, the fines should be estimated to be either silty or clayey using the procedures described in Practice D 2488 and so noted in the report.

9.8.3 For soils estimated to contain 15 % or more fines, a determination of the percent fines, percent sand, and percent gravel is required, and the liquid limit and plasticity index

are required. For soils estimated to contain 90 % fines or more, the percent fines, percent sand, and percent gravel may be estimated using the procedures described in Practice D 2488 and so noted in the report.

10. Preliminary Classification Procedure

10.1 Class the soil as fine-grained if 50 % or more by dry weight of the test specimen passes the No. 200 (75-μm) sieve and follow Section 11.

10.2 Class the soil as coarse-grained if more than 50 % by dry weight of the test specimen is retained on the No. 200 (75-μm) sieve and follow Section 12.

11. Procedure for Classification of Fine-Grained Soils (50 % or more by dry weight passing the No. 200 (75-μm) sieve)

11.1 The soil is an inorganic clay if the position of the plasticity index versus liquid limit plot, Fig. 3, falls on or above the "A" line, the plasticity index is greater than 4, and the presence of organic matter does not influence the liquid limit as determined in 11.3.2.

NOTE 6—The plasticity index and liquid limit are determined on the minus No. 40 (425 μm) sieve material.

11.1.1 Classify the soil as a *lean clay*, CL, if the liquid limit is less than 50. See area identified as CL on Fig. 3.

11.1.2 Classify the soil as a *fat clay*, CH, if the liquid limit



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO: G00409 TASK NO.: 04.1

DESCRIPTION: Phase one II

DATE: 11 day AUG month 1998 year

MATERIAL TYPE: CLAY LINER

SAMPLE NO.: LP-II-65

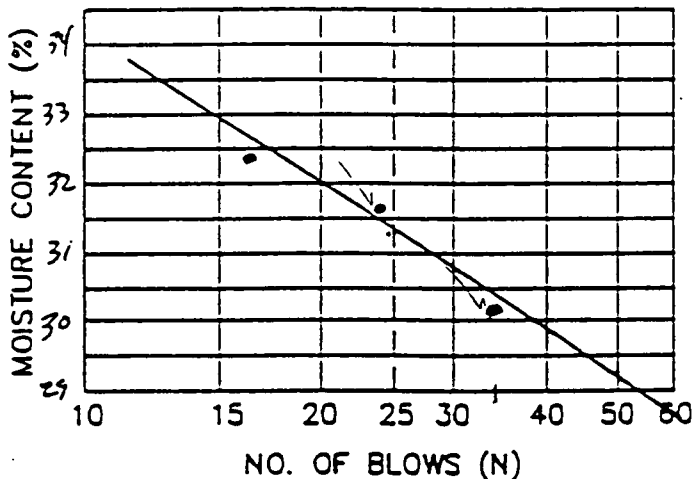
LIQUID LIMIT DETERMINATION

QA ID: NM

	TARE NO.		2.9	1.3	3.2
A	WT. OF TARE	(grams)	31.48	28.65	27.84
B	WT. OF WET SOIL & TARE	(grams)	52.98	49.35	46.64
C	WT. OF DRY SOIL & TARE	(grams)	48.00	44.38	42.04
D	WT. OF WATER = B-C	(grams)	4.98	4.97	4.60
E	WT. OF DRY SOIL = C-A	(grams)	16.52	15.73	14.20
F	MOISTURE CONTENT = (D/E)X100	(%)	30.18	31.61	32.39
N	NUMBER OF BLOWS		34	24	17

DRYING TARE NO.

CURING TARE NO.



PLASTIC LIMIT DETERMINATION

QA ID: NM

	TARE NO.		1.9	2.5
A	WT. OF TARE	(grams)	28.55	28.43
B	WT. OF WET SOIL & TARE	(grams)	37.23	37.97
C	WT. OF DRY SOIL & TARE	(grams)	35.94	36.57
D	WT. OF WATER = B-C	(grams)	1.29	1.40
E	WT. OF DRY SOIL = C-A	(grams)	7.39	8.14
F	MOISTURE CONTENT = (D/E)X100	(%)	17.45	17.20

LIQUID LIMIT (LL) = 31 PLASTIC LIMIT (PL) = 17 PLASTICITY INDEX (PI) = 14



GEO SYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 438/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: G00409 TASK NO.: 04

DESCRIPTION: Phase one II (FERN)

DATE: 10 day Aug month 1998 year

MATERIAL TYPE: CLAY LINER

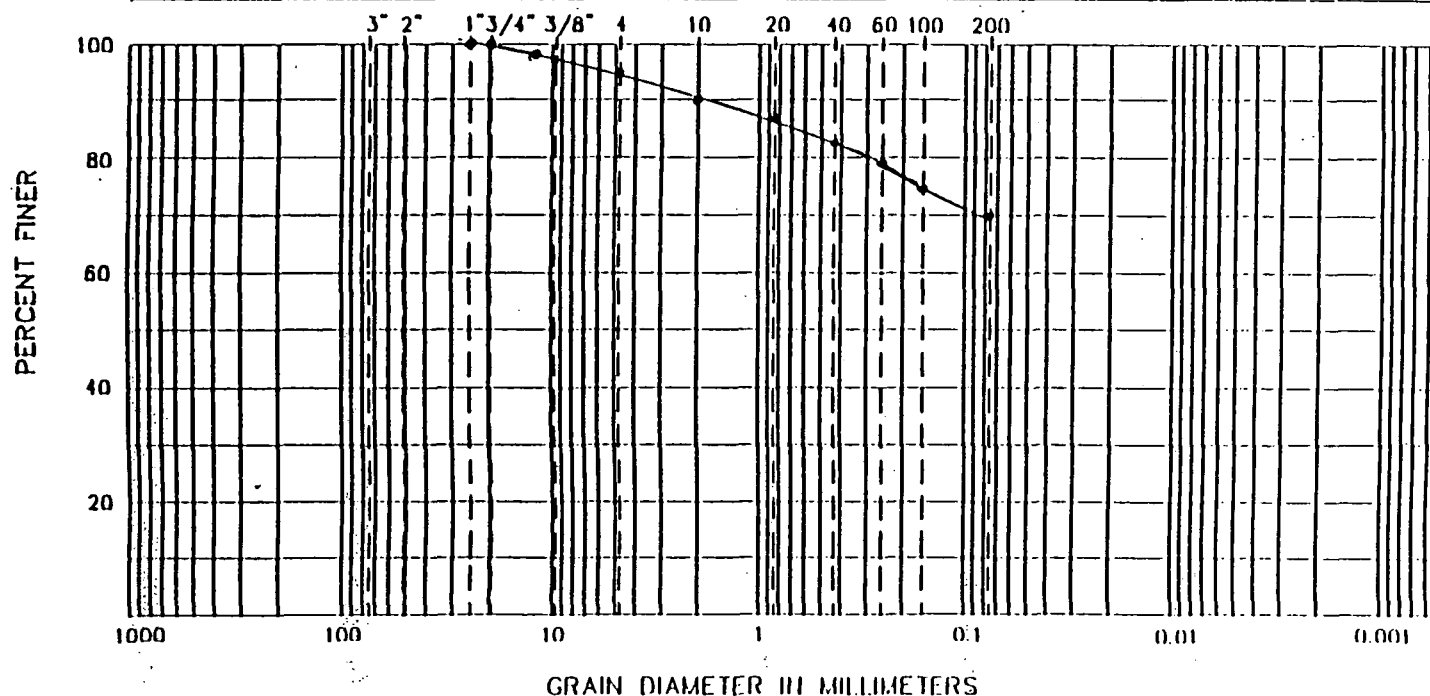
SAMPLE NO.: LP-II-65 QA ID: NM

CURVE COEFFICIENTS: (C_u)

(C_c)

BOULDERS	COBBLES	GRAVEL		SAND			FINE	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

U.S. STANDARD SIEVE SIZES



ATTERBERG LIMITS

(LL) 31

(PL) 17

(PI) 14

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	
2-in.	100.0
1 1/2-in.	100.0
1-in.	100.0
3/4-in.	99.6
1/2-in.	98.2
3/8-in.	97.1
N.O. 4	94.5
N.O. 10	90.3
N.O. 20	86.5
N.O. 40	82.7
N.O. 60	79.3
N.O. 100	74.9
N.O. 200	69.6

HYDROMETER RESULTS

PARTICLE DIA.	% FINER

SOIL CLASSIFICATION (ASTM D 2487): BROWN Sandy lean Clay (CL) w/ some gravel

000211



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD

(ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO: GQ0409 TASK NO.: 04.1

DESCRIPTION: Phase ~~one~~ II

DATE: 6 day Aug month 1998 year

MATERIAL TYPE: Clay Liner

SAMPLE NO.: LPII-65

SOIL SAMPLE SIZE -4 47.26 lb
+4 2.72 lb

Total wt. 49.98 lb (22,670.9gms)

APPROXIMATE MINIMUM WT. OF SAMPLE
(PASSING NO. 10 SIEVE)

(grams)

SAND

115

FINE GRAIN

65

BEFORE WASH

AFTER WASH

TARE NO.

L-2

L-2

WT. OF DRY SAMPLE PLUS TARE

(grams)

812.4

359.2

WT. OF TARE

(grams)

146.7

146.7

WT. OF DRY SAMPLE

(grams)

665.7

212.5

SIEVE ANALYSIS

CA ID: CS/UM

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER	PROJECT SPECIFICATION
2"	50.0	Ø	Ø	100.0	100.0
1 1/2"	37.5	Ø	Ø	100.0	
1"	25.0	Ø	Ø	100.0	
3/4"	19.0	83.85.3	0.4	99.6	90-100
1/2"	12.5	405.9	1.8	98.2	
3/8"	9.5	647.9	2.9	97.1	
#4	4.75	1235.7	5.5	94.5	
10	2.00	29.6	4.5	95.5	90.3
20	0.85	56.5	8.5	91.5	86.5
40	0.425	83.1	12.5	87.5	82.7
60	0.250	107.3	16.1	83.9	79.3
100	0.150	137.5	20.7	79.3	74.9
200	0.075	175.2	26.3	73.7	69.6
PAN	—	212.5	—	—	—

%FINER = 100 - Σ% RETAINED

GeoSYNTEC CONSULTANTS FILE NO. 2-14-PMS

CHECKED BY:

000245

SHEET NO. 1 OF 2

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GEO SYNTEC CONSULTANTS
Geomechanics and Environmental Laboratory
Atlanta, Georgia

FIGURE

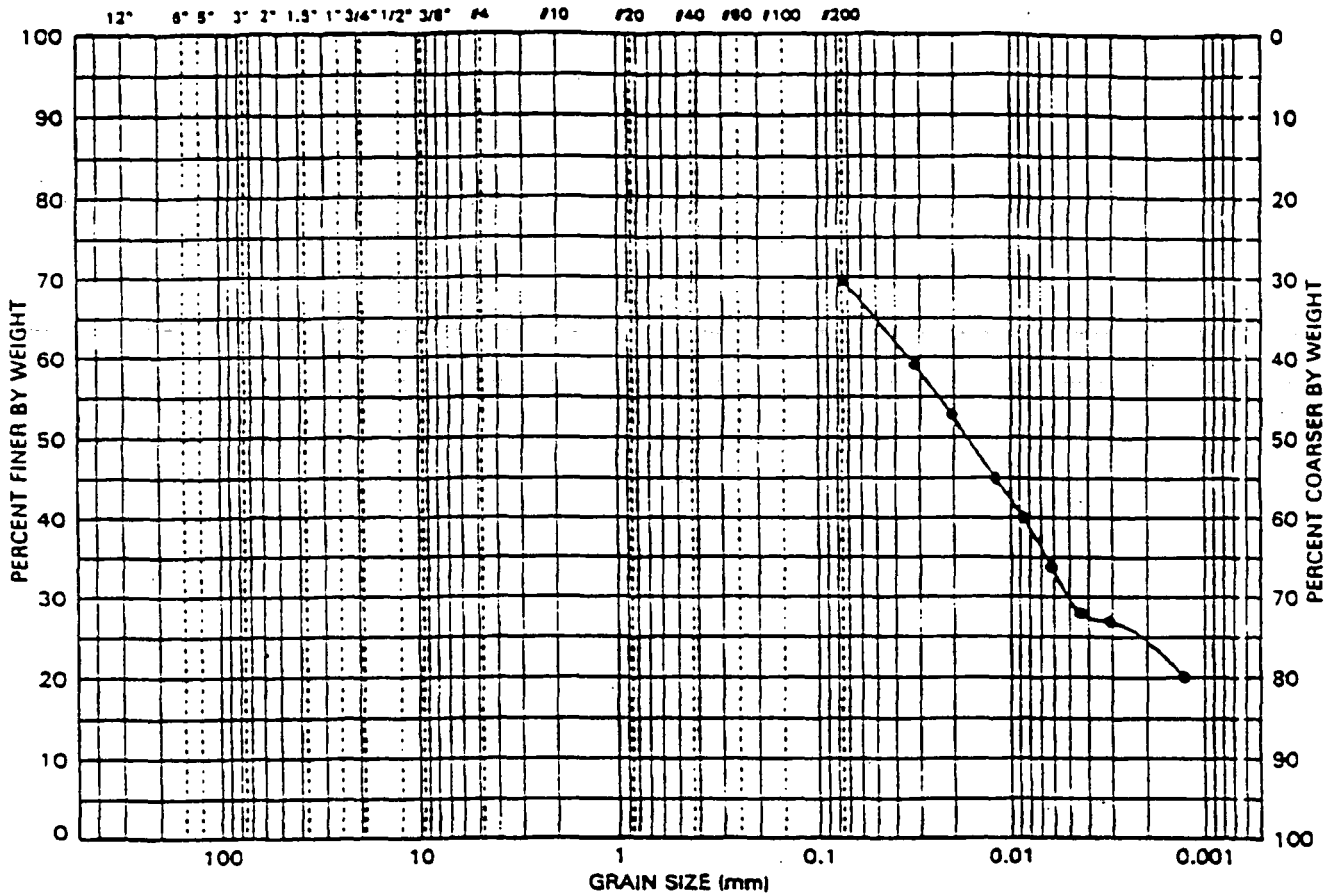
PROJECT: OSDF Phase II
PROJECT NO.: G00409
DOCUMENT NO.:

GS FORM:
4PS2 08/11/98

PARTICLE SIZE DISTRIBUTION AND PHYSICAL PROPERTIES

ASTM C 136, D 422, D 2487
D 3042 AND D 4318

U.S. STANDARD SIEVE SIZES AND NUMBERS



AUG 1 1 1330 PM '94



GEO SYNTec CONSULTANTS

Geomechanics and Environmental Laboratory

Sample ID: LP-11-65

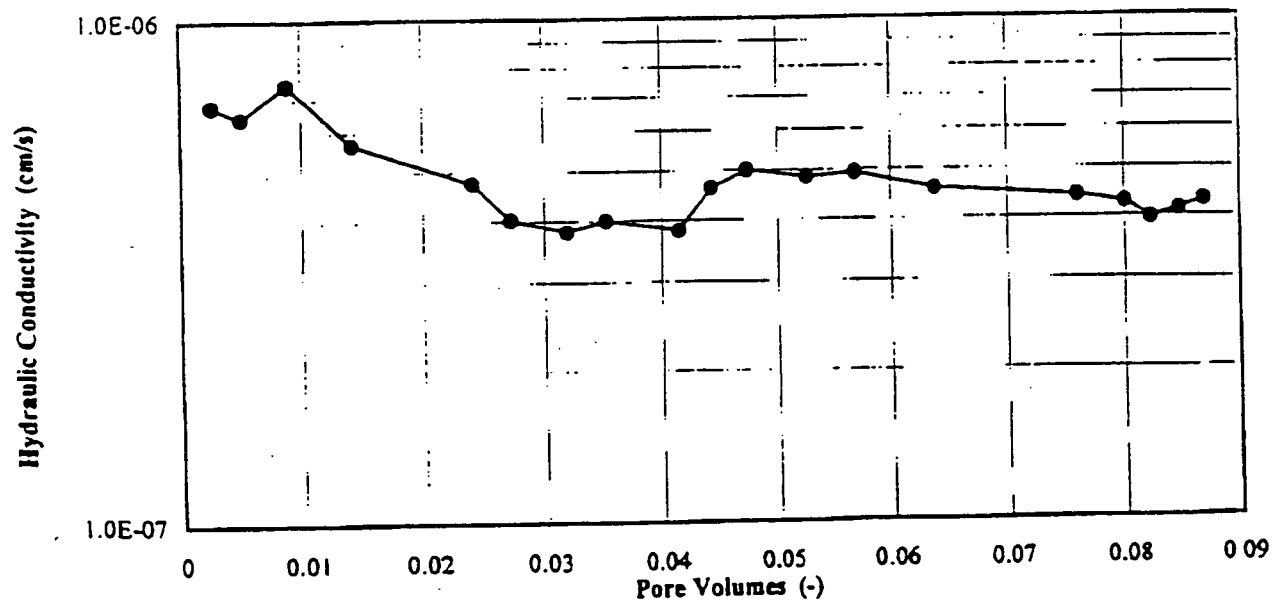
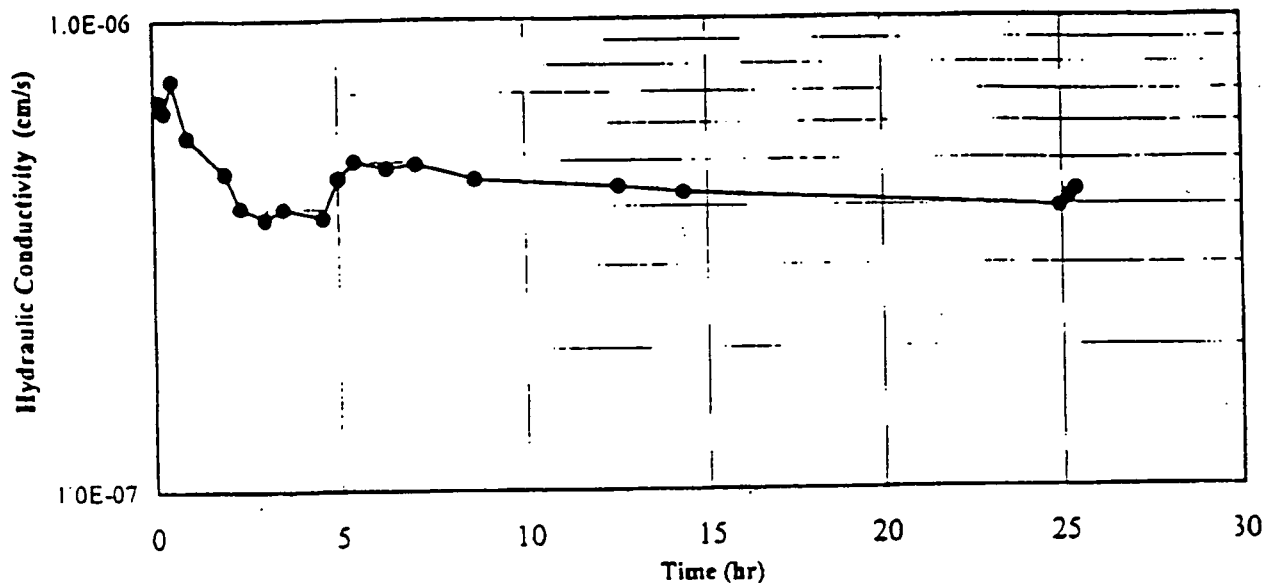
Project Name: OSDF - Phase II

Project No.: GQ0409

ASTM D 5084

HYDRAULIC CONDUCTIVITY TESTING

Figure



Sample ID	Lab Sample No.	Specimen Initial Condition		Consolidation Pressure, σ_c (psi)	Hydraulic Conductivity, k (cm/s)
		Dry Unit Weight (pcf)	Moisture Content (%)		
LP-11-65	98H71	116.7	16.1	5	4.2E-7

Note(s):

000247

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GEOSYNTEC CONSULTANTS

Geomechanics and Environmental
Laboratory

Sample ID: LP-II-65

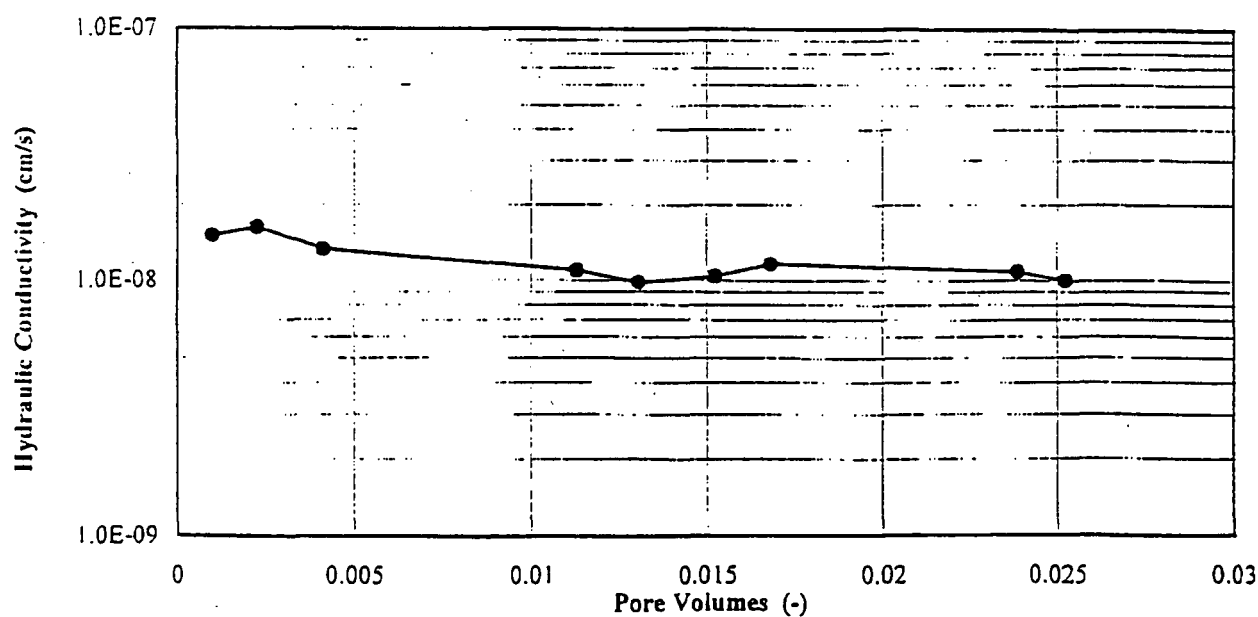
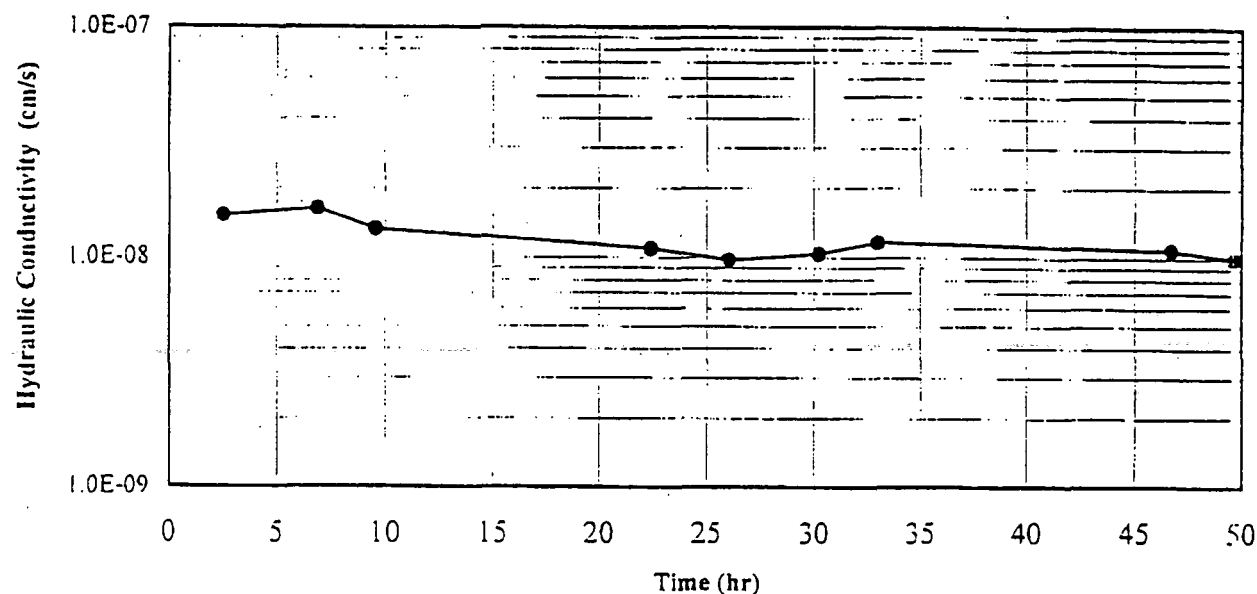
Project Name: OSDF - Phase II

Project No.: GQ0409

ASTM D 5084

HYDRAULIC CONDUCTIVITY TESTING

Figure



Sample ID	Lab Sample No.	Specimen Initial Condition		Consolidation Pressure, σ_c (psi)	Hydraulic Conductivity, k (cm/s)
		Dry Unit Weight (pcf)	Moisture Content (%)		
LP-II-65	98H71.2	114.5	17.4	5	1.1E-8

Note(s):

000248



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD A)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04.1

DESCRIPTION: Phase one II (New)

DATE: 07 day Aug month 1998 year

MATERIAL TYPE: Clay

SAMPLE NO.: LP-II-65

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, AND IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS LESS THAN 20% ALL MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS DISCARDED. USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718. USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

5.5% RETAINED
ON #4

COMPACTION OF SOIL

QA ID: P2/R

	WATER ADDED	(ml)		<u>4%</u>	<u>6%</u>	<u>8%</u>	<u>10%</u>
A	WT. OF SOIL & MOLD	(grams)		<u>13.42/6091.8</u>	<u>13.62/6200.7</u>	<u>13.73/6227.9</u>	<u>13.65/6491.6</u>
B	WT. OF MOLD	(grams)	<u>4209.4</u>	<u>4209.4</u>	<u>4209.4</u>	<u>4209.4</u>	<u>4209.4</u>
C	WT. OF SOIL = A - B	(grams)		<u>1882.4</u>	<u>1991.3</u>	<u>2018.5</u>	<u>1982.2</u>
D	WET UNIT WT. ⁽¹⁾ = C X 0.066	(pcf)		<u>124.2</u>	<u>131.4</u>	<u>133.2</u>	<u>130.8</u>
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		<u>110.7</u>	<u>115.3</u>	<u>114.4</u>	<u>110.6</u>

NOTE: IF CALIBRATED MOLD OF 1/30 FT³ IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT³ ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: P2/R

	TARE NO.		<u>#25</u>	<u>#1</u>	<u>#23</u>	<u>#24</u>
F	WT. OF TARE	(grams)	<u>8.2</u>	<u>7.3</u>	<u>8.4</u>	<u>8.4</u>
G	WT. OF WET SOIL & TARE	(grams)	<u>210.2</u>	<u>285.40</u>	<u>259.5</u>	<u>284.8</u>
H	WT. OF DRY SOIL & TARE	(grams)	<u>188.3</u>	<u>251.3</u>	<u>224.2</u>	<u>242.0</u>
I	WT. OF WATER = G - H	(grams)	<u>21.9</u>	<u>34.1</u>	<u>35.3</u>	<u>42.8</u>
J	WT. DRY SOIL = H - F	(grams)	<u>180.1</u>	<u>244</u>	<u>215.8</u>	<u>233.6</u>
K	MOISTURE CONTENT = (I/J) X 100	(%)	<u>12.2</u>	<u>14.0</u>	<u>16.4</u>	<u>18.3</u>

000243



GEOSYNTEC CONSULTANTS

FLUOR DANIEL
FERNALD

2064

MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

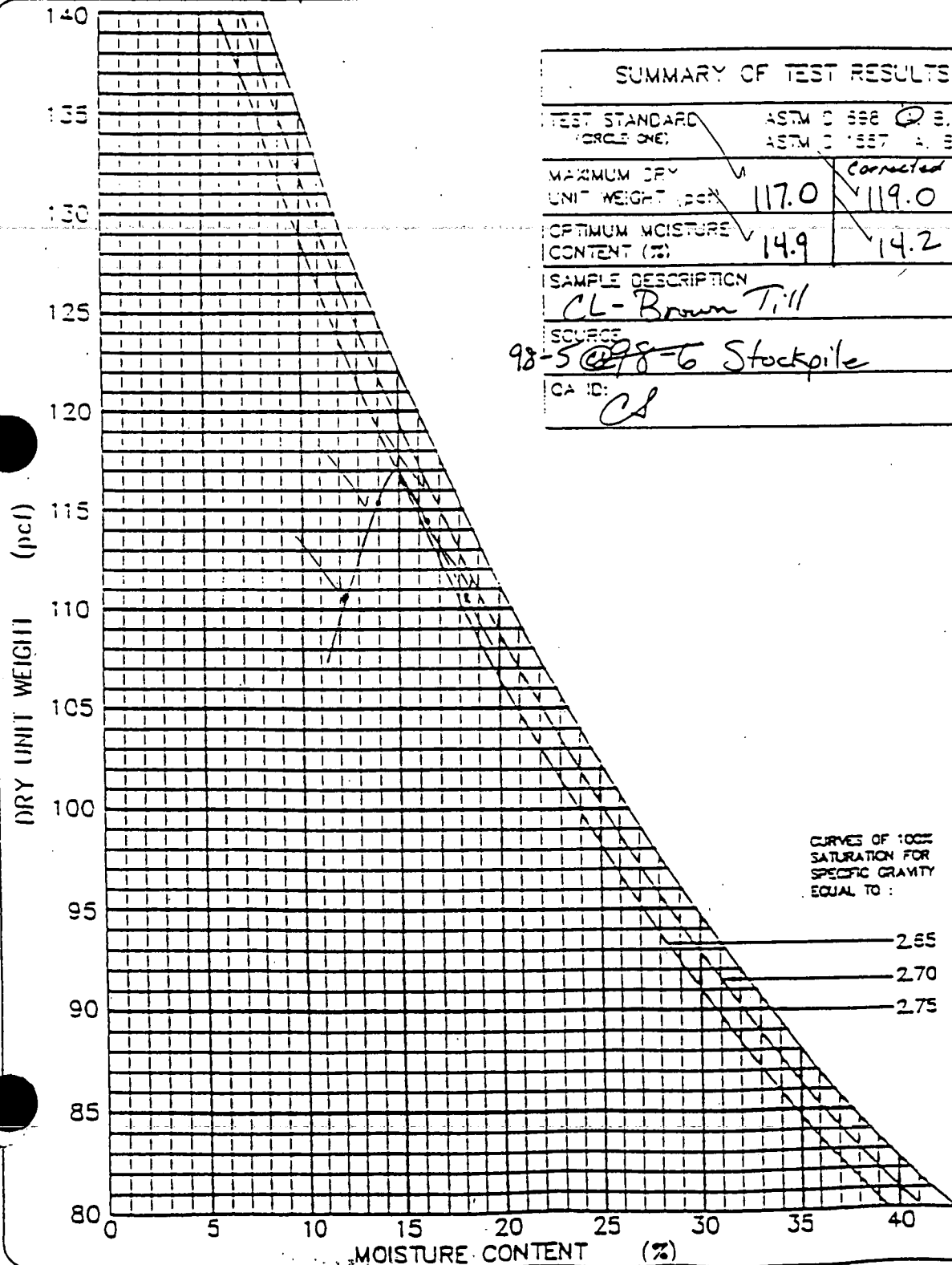
PROJECT NO: G00409 TASK NO.: 04.1

DESCRIPTION: Phase ~~one~~ II

DATE: 8 day Aug month 1998 year

MATERIAL TYPE: Clay Liner

SAMPLE NO.: LPD-65



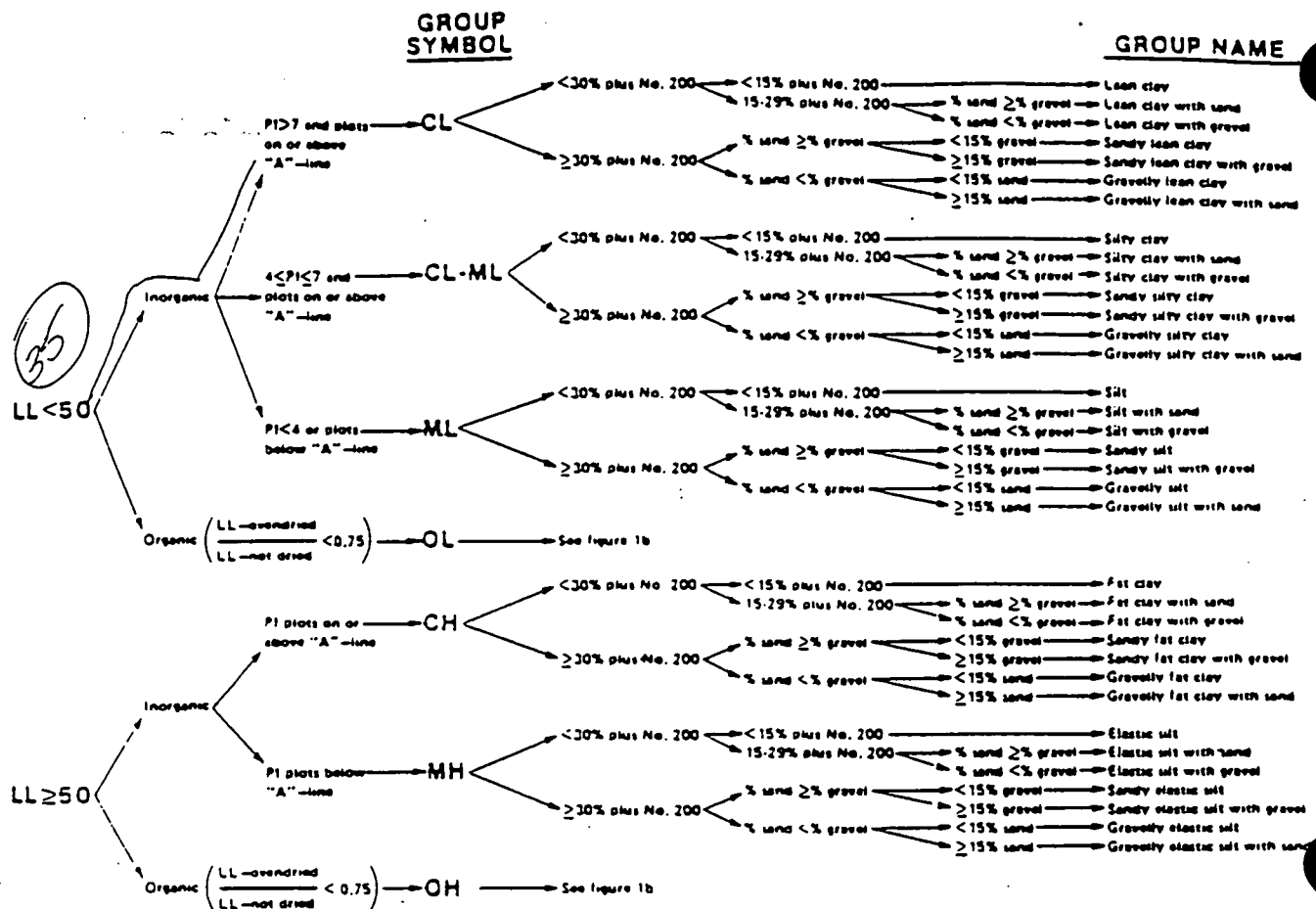


FIG. 1a Flow Chart for Classifying Fine-Grained Soil (50 % or More Passes No. 200 Sieve)

following sizes (with the largest size commensurate with the maximum particle size) with other sieve sizes as needed or required to define the particle-size distribution:

- 3-in. (75-mm)
- 3/4-in. (19.0-mm)
- No. 4 (4.75-mm)
- No. 10 (2.00-mm)
- No. 40 (425-μm)
- No. 200 (75-μm)

9.8 The tests required to be performed in preparation for classification are as follows:

9.8.1 For soils estimated to contain less than 5 % fines, a plot of the cumulative particle-size distribution curve of the fraction coarser than the No. 200 (75-μm) sieve is required. The cumulative particle-size distribution curve may be plotted on a graph similar to that shown in Fig. 4.

9.8.2 For soils estimated to contain 5 to 15 % fines, a cumulative particle-size distribution curve, as described in 9.8.1, is required, and the liquid limit and plasticity index are required.

9.8.2.1 If sufficient material is not available to determine the liquid limit and plasticity index, the fines should be estimated to be either silty or clayey using the procedures described in Practice D 2488 and so noted in the report.

9.8.3 For soils estimated to contain 15 % or more fines, a determination of the percent fines, percent sand, and percent gravel is required, and the liquid limit and plasticity index

are required. For soils estimated to contain 90 % fines or more, the percent fines, percent sand, and percent gravel may be estimated using the procedures described in Practice D 2488 and so noted in the report.

10. Preliminary Classification Procedure

10.1 Class the soil as fine-grained if 50 % or more by dry weight of the test specimen passes the No. 200 (75-μm) sieve and follow Section 11.

10.2 Class the soil as coarse-grained if more than 50 % by dry weight of the test specimen is retained on the No. 200 (75-μm) sieve and follow Section 12.

11. Procedure for Classification of Fine-Grained Soils (50 % or more by dry weight passing the No. 200 (75-μm) sieve)

11.1 The soil is an inorganic clay if the position of the plasticity index versus liquid limit plot, Fig. 3, falls on or above the "A" line, the plasticity index is greater than 4, and the presence of organic matter does not influence the liquid limit as determined in 11.3.2.

NOTE 6—The plasticity index and liquid limit are determined on the minus No. 40 (425 μm) sieve material.

11.1.1 Classify the soil as a *lean clay*, CL, if the liquid limit is less than 50. See area identified as CL on Fig. 3.

11.1.2 Classify the soil as a *fat clay*, CH, if the liquid limit



GeoSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

ATTERBERG LIMITS TEST (ASTM D 4318)

2064

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO: G00409 TASK NO.: 04.1

DESCRIPTION: Phase one II HEW

DATE: 10 day Aug month 1998 year

MATERIAL TYPE: CLAY LINER

SAMPLE NO.: LP-II-58

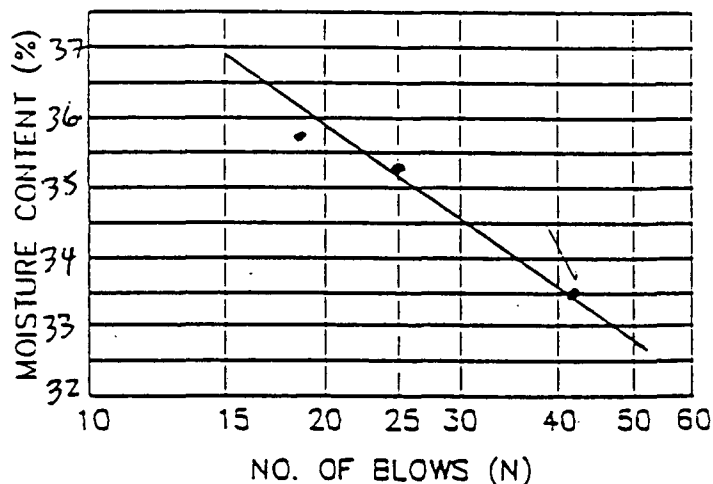
LIQUID LIMIT DETERMINATION

QA ID: JM

TARE NO.		1.5	2.7	2.4
A	WT. CF TARE (grams)	28.63	28.72	27.40
B	WT. CF WET SOIL & TARE (grams)	47.41	49.36	49.58
C	WT. CF DRY SOIL & TARE (grams)	42.70	43.97	43.74
D	WT. CF WATER = B-C (grams)	4.71	5.39	5.84
E	WT. CF DRY SOIL = C-A (grams)	14.07	15.25	16.34
F	MOISTURE CONTENT = (D/E)X100 (%)	33.5	35.3	35.7
N	NUMBER OF BLOWS	42	25	18

DRYING TARE NO.

CURING TARE NO.



CL

PLASTIC LIMIT DETERMINATION

QA ID: NM

TARE NO.		3.1	3.2
A	WT. CF TARE (grams)	27.43	27.86
B	WT. CF WET SOIL & TARE (grams)	38.39	36.67
C	WT. CF DRY SOIL & TARE (grams)	36.90	35.34
D	WT. CF WATER = B-C (grams)	1.49	1.33
E	WT. CF DRY SOIL = C-A (grams)	8.47	7.48
F	MOISTURE CONTENT = (D/E)X100 (%)	17.6	17.8

LIQUID LIMIT (LL) = 35 PLASTIC LIMIT (PL) = 18 PLASTICITY INDEX (PI) = 17



GEO SYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD

(ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO: G00409 TASK NO.: 04.1

DESCRIPTION: Phase ~~one~~ II

DATE: 6 day Aug month 1998 year

MATERIAL TYPE: Clay Limer

SAMPLE NO.: LPII-58

 SOIL SAMPLE SIZE
 $4 = 45.63 \text{ lb}$
 $+ 4 = 2.67 \text{ lb}$

 Total = $48.30 \text{ lb} = 21908.99$
 5.5%
APPROXIMATE MINIMUM WT. OF SAMPLE
(PASSING NO. 10 SIEVE)

(grams)

SAND

115

FINE GRAIN

65

		BEFORE WASH	AFTER WASH
TARE NO.		L-1	L-1
WT. OF DRY SAMPLE PLUS TARE	(grams)	741.0	309.8
WT. OF TARE	(grams)	147.2	147.2
WT. OF DRY SAMPLE	(grams)	593.8	162.6

SIEVE ANALYSIS

CA ID: 01

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER	PROJECT SPECIFICATIO
2"	50.0	0	0	100	
1 1/2"	37.5	0	0	100	
1"	25.0	20.2	0.09	99.9	
3/4"	19.0	128.3	0.6	99.4	
1/2"	12.5	507.4	2.3	97.7	
3/8"	9.5	729.4	3.3	96.7	REQUIRE
#4	4.75	1212.4	5.5	94.5	CORRECT
10	2.00	19.4	3.3	96.7	91.4
20	0.85	42.4	7.1	92.9	87.8
40	0.425	64.9	10.9	89.1	84.2
60	0.250	83.8	14.1	85.9	81.2
100	0.150	106.5	17.9	82.1	77.6
200	0.075	137.5	23.2	76.8	72.6
PAN	-	162.6	-	-	-

% FINER = $100 - \sum \% \text{ RETAINED}$

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS

CHECKED BY:

KB T000253 SHEET NO. 1 of 2



GEOSYNTEC CONSULTANTS

FLUOR DANIEL
FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase one II

MATERIAL TYPE: Clay Liner

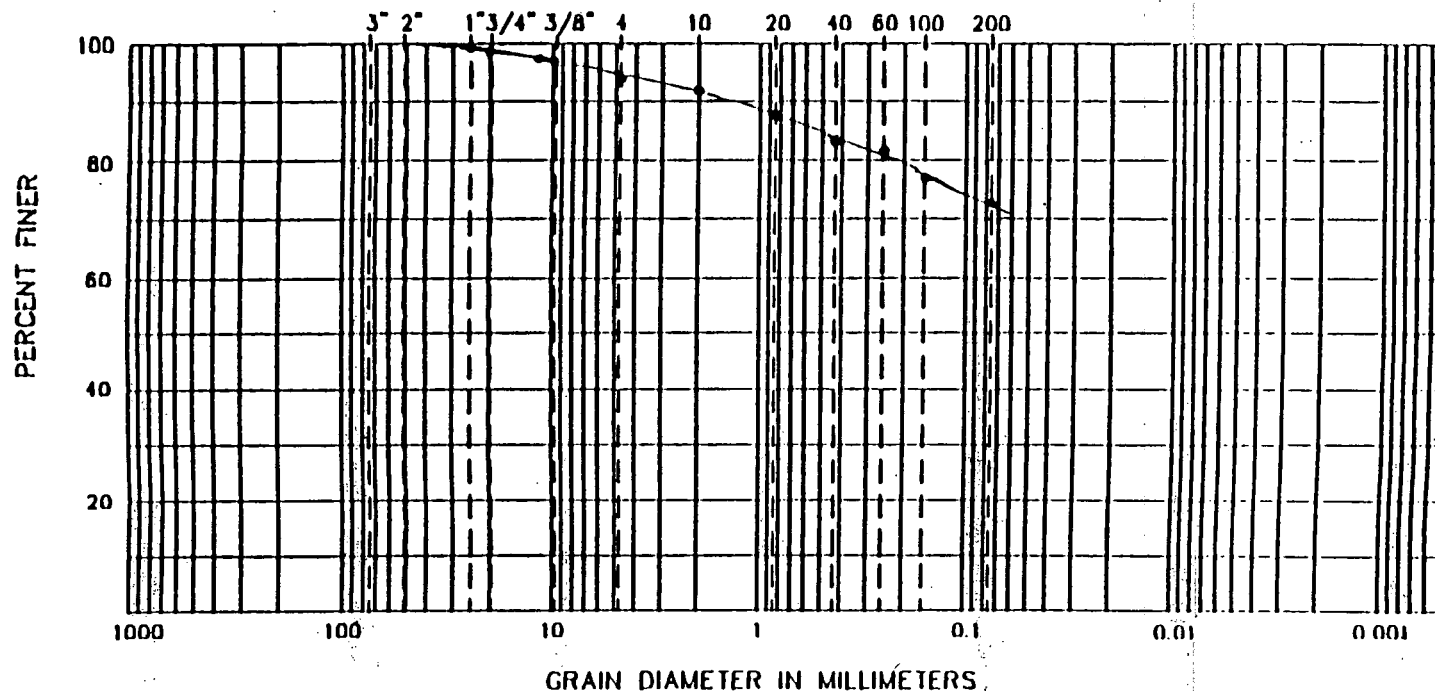
PROJECT NO.: G00409 TASK NO.: 04

DATE: 6 day Aug month 1998 year

SAMPLE NO.: LP4-58 QA ID: CL

CURVE COEFFICIENTS: (C_u) (C_c)

BOULDERS	COBBLES	GRAVEL		SAND			FINE	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES
U.S. STANDRAD SIEVE SIZES								



ATTERBERG LIMITS

(LL)

(PL)

(PI)

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.9
3/4-in.	99.4
1/2-in.	97.7
3/8-in.	96.7
NO. 4	94.5
NO. 10	91.4
NO. 20	87.8
NO. 40	84.2
NO. 60	81.2
NO. 100	77.6
NO. 200	72.6

HYDROMETER RESULTS

PARTICLE DIA.	% FINER

SOIL CLASSIFICATION (ASTM D 2487):



GEO SYNTEC CONSULTANTS
Geomechanics and Environmental Laboratory
Atlanta, Georgia

FIGURE

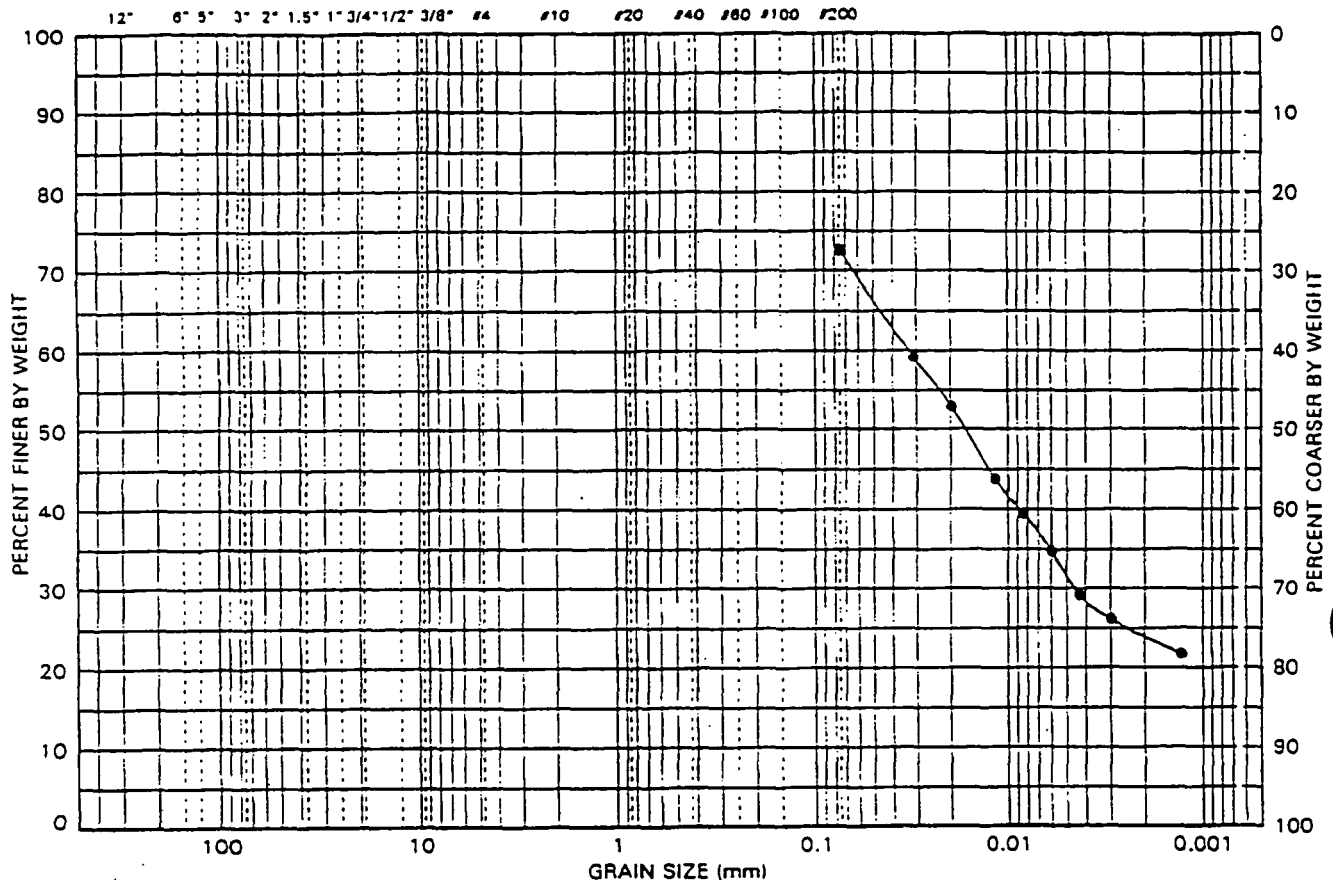
PROJECT: OSDF-Phase II
PROJECT NO.: GQ0409
DOCUMENT NO.:

GS FORM:
4PS2 08/11/98

PARTICLE SIZE DISTRIBUTION AND PHYSICAL PROPERTIES

ASTM C 136, D 422, D 2487
D 3042 AND D 4318

U.S. STANDARD SIEVE SIZES AND NUMBERS



SOIL DATA	COBBLES	COARSE GRAVEL	FINE GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	SILT	CLAY

SITE SAMPLE ID		LP-II-58		LIQUID LIMIT (%)		SOIL FRACTIONS		GRAVEL (%)										
LAB. SAMPLE NO.		98H66		PLASTIC LIMIT (%)				SAND (%)										
SAMPLE DEPTH (ft)				PLASTICITY INDEX				FINES (%) 72.6										
SOIL CLASSIFICATION:								SILT (%) 48.6										
								CLAY (%) 24.0										
								COEFF. UNIFORMITY (Cu)										
								COEFF. CURVATURE (Cc)										
PERCENT PASSING U.S. STANDARD SIEVE SIZES AND NUMBERS														PERCENT FINER THAN HYDROMETER PARTICLE DIAMETER (mm)				
3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#20	#40	#60	#100	#200	0.050	0.020	0.005	0.002	0.001
PERCENT PASSING SIEVE SIZES (mm)																		
75	50	37.5	25	19	12.5	9.5	4.75	2.00	0.850	0.425	0.250	0.150	0.075	73	66	53	32	24

NOTES:

000255

2064



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Geomechanics and Environmental
Laboratory

Sample ID: LP-II-58

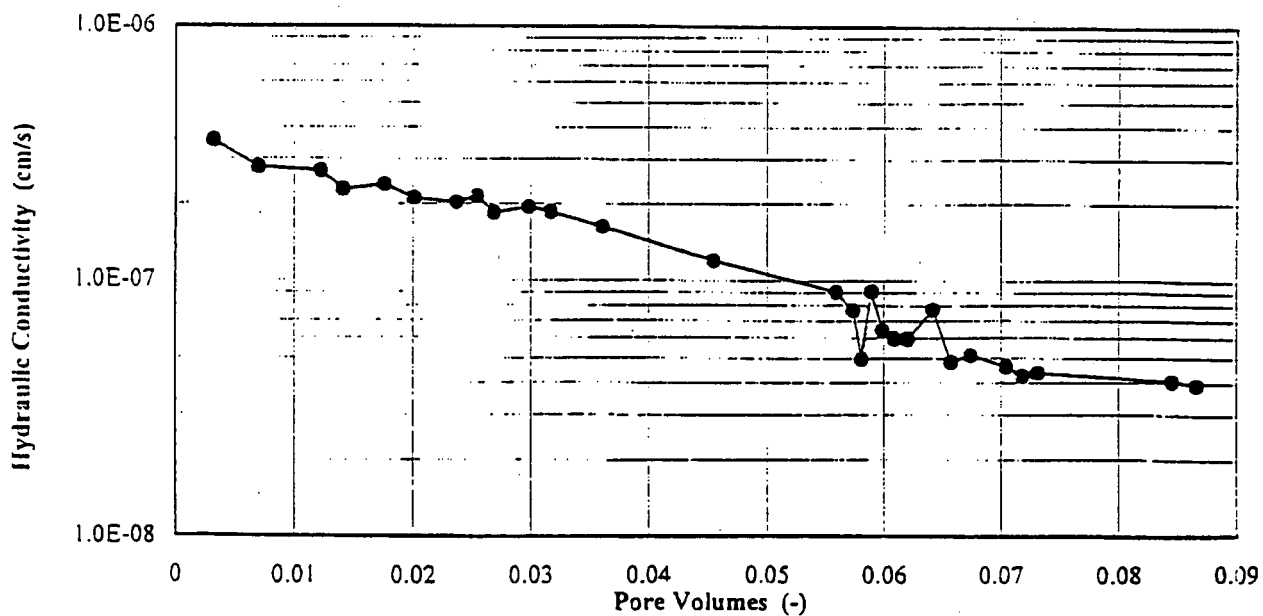
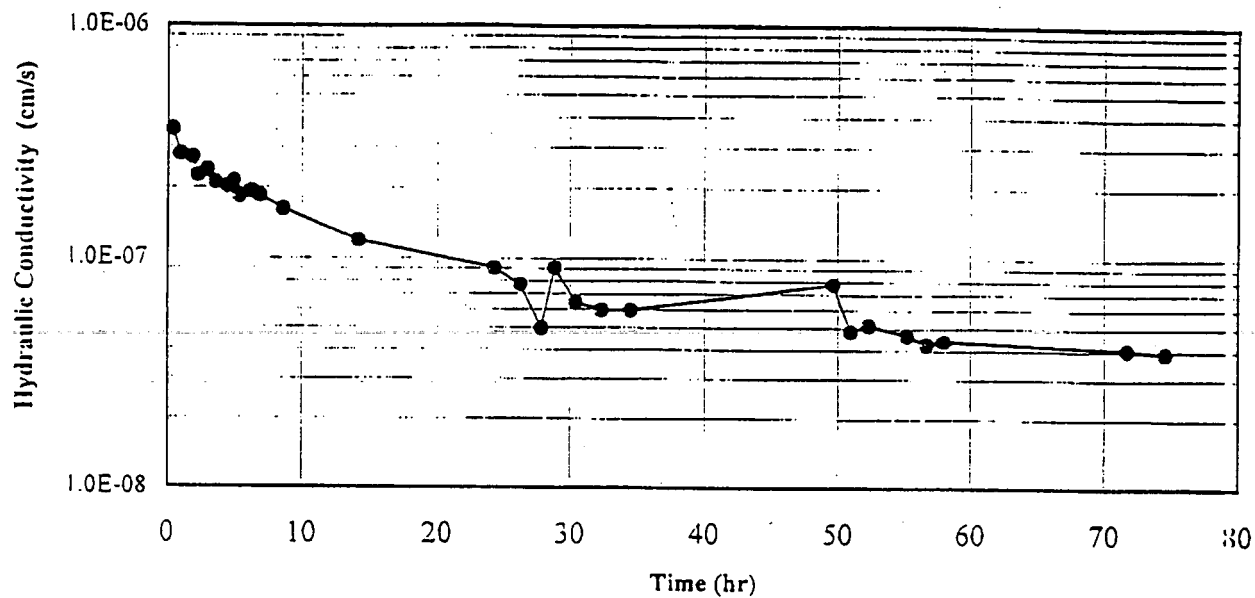
Project Name: OSDF - Phase II

Project No.: GQ0409

ASTM D 5084

HYDRAULIC CONDUCTIVITY TESTING

Figure



Sample ID	Lab Sample No.	Specimen Initial Condition		Consolidation Pressure, σ_c (psi)	Hydraulic Conductivity, k (cm/s)
		Dry Unit Weight (pcf)	Moisture Content (%)		
LP-II-58	98H66	113.7	17.4	5	4.2E-8

Note(s):

000256



GEOSYNTEC CONSULTANTS

FLUOR DANIEL
FERNALD

MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

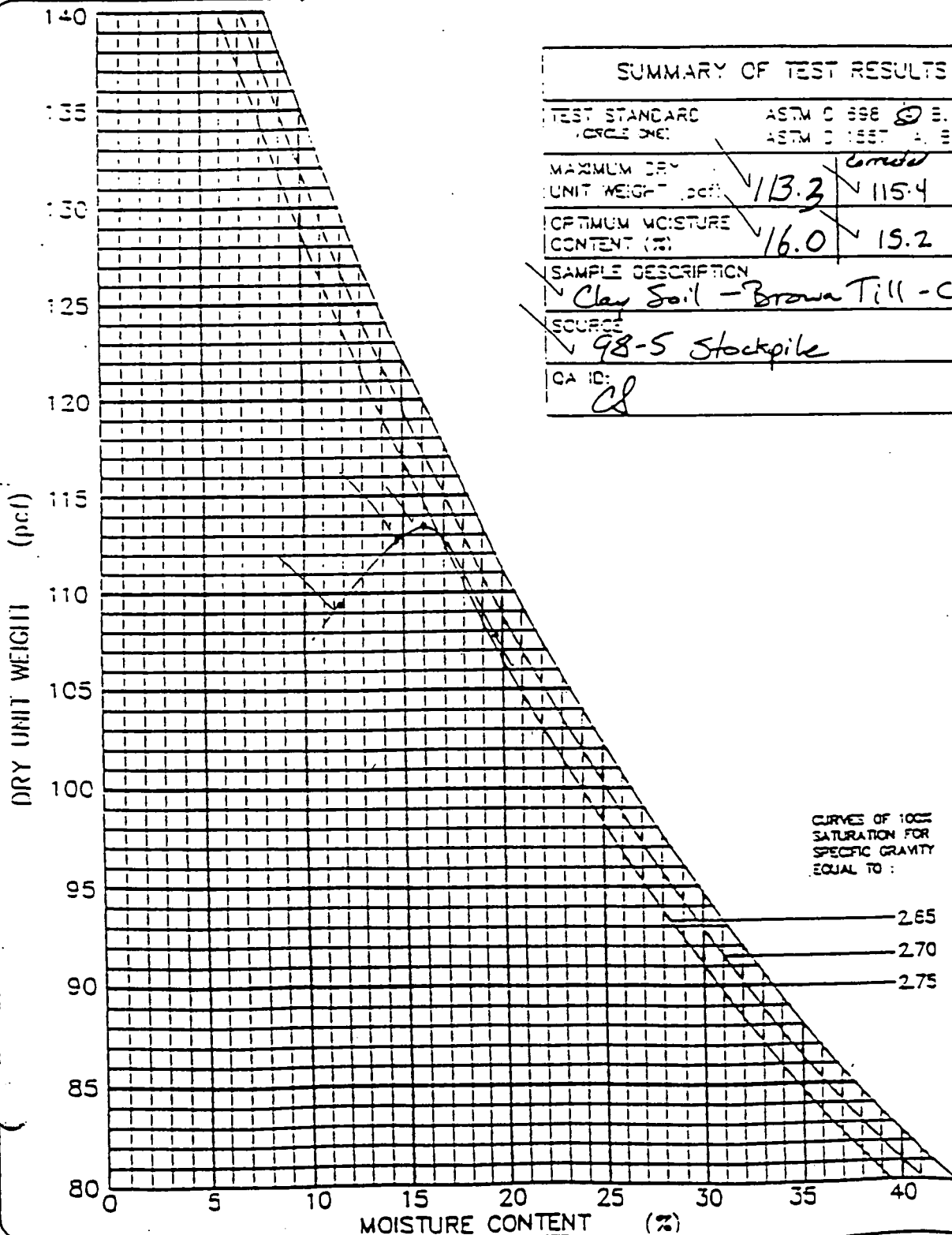
PROJECT NO: G00409 TASK NO.: 04.1

DESCRIPTION: Phase ~~one~~ II

DATE: 8 day Aug month 1998 year

MATERIAL TYPE: Clay Liner

SAMPLE NO.: LP11-58



000257



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD A)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase ~~one~~ II

MATERIAL TYPE: clay

PROJECT NO.: GQ0409 TASK NO.: 04.1

DATE: 07 day Aug month 1998 year

SAMPLE NO.: 4-II-58

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-IN. (19-MM) SIEVE IS LESS THAN 30%, AND IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-MM) SIEVE IS LESS THAN 20%. ALL MATERIAL RETAINED ON THE NO. 4 (4.75-MM) SIEVE IS DISCARDED. USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718. USE A 4-IN. DIAMETER MOLD / 5.5-LB RAMMER / 12-IN. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: R7/DE

	WATER ADDED	(ml)		6%	8%	10%	12%
A	WT. OF SOIL & MOLD	(grams)		13.37/1664.6g	13.61/1612.5g	13.67/1620.7	13.59/1611.4
B	WT. OF MOLD	(grams)		4209.4	4209.4	4209.4	4209.4
C	WT. OF SOIL = A - B	(grams)		1855.2	1964.1	1991.3	1955.0
D	WET UNIT WT. ⁽¹⁾ = C X 0.066	(pcf)		122.4	129.6	131.4	129.0
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		109.4	112.9	113.3	107.9

NOTE: IF CALIBRATED MOLD OF 1/30 FT³ IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT³ ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: R7/DE

	TARE NO.		ne 12	20	34	105
F	WT. OF TARE	(grams)	7.3	8.3	8.4	8.3
G	WT. OF WET SOIL & TARE	(grams)	137.3	226.5	236.6	229.7
H	WT. OF DRY SOIL & TARE	(grams)	123.5	199.3	205.0	185.1
I	WT. OF WATER = G - H	(grams)	13.8	28.2	31.5	34.6
J	WT. DRY SOIL = H - F	(grams)	116.2	190.0	196.7	176.8
K	MOISTURE CONTENT = (I/J) X 100	(%)	11.9	14.8	16.0	19.6

000258



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Page 1 of 1

CONSTRUCTION NONCONFORMANCE REPORT

ORIGINATOR: <i>Daniel Bodine</i>	TITLE/ORGANIZATION: <i>GeoSyntec</i>	NCR NUMBER: <i>1702-011</i>	DATE DISCOVERED: <i>22 Dec 1997</i>
RESPONSIBLE ORGANIZATION/PROJECT: <i>Petro Environmental Technologies</i>		ASSESSMENT ACTIVITY: <i>Construction Quality Control</i>	HOLD TAG. () YES <input checked="" type="checkbox"/> NO REMOVED (Initial/Date):
REQUIREMENTS (Identify requirement from document [e.g., CQA plan, specification, drawing, etc.]): <i>Specification Section 02230 Rev. 0 Parts 3.04 C and 3.05 C require the Subbase and Base Aggregate to be compacted to the requirements of Ohio DOT Specifications Items 3106.03 and 304.04, respectively. These items require the aggregate to be compacted to 98% of the "test density" determined in a test section.</i>			
NONCONFORMANCE TYPE: <input checked="" type="checkbox"/> Construction Nonconformance <input type="checkbox"/> Material Deviation ()			
NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required): <i>Petro constructed, as part of its production work, a test section in aggregate placed for the impacted material haul road. Petro never successfully completed the test section to arrive at an appropriate "test density" for the No. 304 stone Aggregate. Therefore, density testing remained incomplete for the haul road and Access Road Corridor. A test density was assumed at 135.4 lbs/ft³ base on</i>			
ORIGINATOR'S SIGNATURE: <i>Daniel Bodine</i>		DATE PROVIDED TO RESPONSIBLE MANAGER: <i>11/28 Dec 1998</i>	
RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION:		Use As-Is () Repair () Reject () Rework <input checked="" type="checkbox"/> Other <input checked="" type="checkbox"/>	
<ol style="list-style-type: none"> 1 - Provide additional testing of IM Haul Road and test test Access Corridor after recompaction. 2 - Because "Test Density" value of 135.4 lbs/ft³ had not been approved final, because of varied results (2.7 lb/ft³ of test section, use standard Proctor (ASTM D 698) maximum density for #304 stone to determine compliance with minimum 98% of Test Density 			
RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION): <i>Daniel Bodine, Project Manager GeoSyntec</i>			
RESPONSIBLE MANAGER'S SIGNATURE: <i>Daniel Bodine</i>		PROPOSED COMPLETION DATE: <i>14 Dec 1998</i> <i>27 Dec 1998</i>	DATE FORWARDED TO APPROVAL AUTHORITY: <i>18 Dec 1998</i>

000259



GeoSyntec Consultants

Page 2 of 2

CONSTRUCTION NONCONFORMANCE REPORT

EVALUATION OF PROPOSED CORRECTIVE ACTION:		Accept <input checked="" type="checkbox"/>	Reject <input type="checkbox"/>
Comments () 1. Eight Field Densities Taken on 20 Nov. 1998 on IM Haul Road. Results compared to #304 Proctor (VBR-01) having Maximum Density of 136.2 lb/ft ³ . Results show percent compaction values 100.6 % to 106.3 % all > 98%. 2. Field density testing was conducted on 7 and 10 Dec. 1998 for the Access Corridor Road and Turnaround. Results compared to #304 Proctor (VBR-01) show final percent compaction values 98.4 % to 103.7 % all > 98% minimum required.			
APPROVAL AUTHORITY SIGNATURE:		DATE:	
		12 Dec 1998	
VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):			
The density test results taken on the 1m haul road and on the access corridor were all greater than 98% of the maximum density of 136.2 pcf determined through ASTM D 698-C. Note three test results were below 98% and retested after further compaction effort.			
VERIFIER'S SIGNATURE:		DATE:	
		11 Dec 1998	
APPROVAL AUTHORITY SIGNATURE:		DATE CLOSED:	
		12 Dec 1998	
CONTINUATION FROM BLOCK 11:			
the maximum density obtained. The CM allowed construction to proceed. Attached is the Test Area Field Density Test Log from the 17 Dec 1997 Test Section Monitoring and a Field Density Test Log report for the Impacted Material Haul Road dated 22 Dec 1997. The material represented by the "failed" tests on the 22 Dec 1997 report was removed on 9 Feb. 1998 has documented in the 17 March 1998 memorandum (also attached). Additional stone was added to the IM Haul Road and Access Corridor in the spring of 1998. Retesting of the IM Haul Road and Testing of the Access Corridor after final compaction remained to be completed.			

000260



GEOSYNTEC CONSULTANTS



FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASIM D 3017 AND ASTM D 2922)

PROJECT: OIL-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0166 TASK NO.: 04.1

DESCRIPTION: PHASE I CONSTRUCTION

DATE: 17 day DEC month 1997 year

SPECIFICATION REQUIREMENTS

SOURCE: EAST HANCOCK MARTIN MARIETTA 13/18/97 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY / OTHER 304 AGG BASE LIFT THICKNESS (LOOSE / COMPACTED) 6"
(CIRCLE ONE)

% COMPACTION: TEST AREA * MOISTURE RANGE: TEST AREA * ASIM D 698: A B C / ASTM D 1557: A B C *TEST AREA
(CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3430 NUCLEAR GAUGE SERIAL NO. 27418 COR. FACTOR: 0 QA ID: SA

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS							RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	PMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	PASS	FAIL
T- 1	TEST AREA / ² PASS	BS / 1	*	*	*	4.6	135.4	129.4	N/A	-	-	-	-	-
T- 2	↓ / ⁴ PASS	↓	↓	↓	↓	4.7	141.8	135.4	↓	-	-	-	-	-
T- 3	↓ / ⁵ PASS	↓	↓	↓	↓	4.9	138.7	132.2	↓	-	-	-	-	-
T- 4	↓ / ⁶ PASS	↓	↓	↓	↓	4.9	134.8	128.65 068	↓	-	-	-	-	-

COMMENTS: * TECH. SPEC. SECTION 02230; PART 3.05 C.

** TARGET DENSITY 135.4 pcf (98% MINIMUM)



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD C)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: LCS CONSTRUCTION

MATERIAL TYPE: ROAD BASE (NO. 304 BASE AGGREGATE)

PROJECT NO.: GQ0166 TASK NO.: 04.1

DATE: 03 day July month 1997 year

SAMPLE NO.: VRB-01

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS GREATER THAN 20%. ALL MATERIAL RETAINED ON THE NO. 3/4-in. (19.0-mm) SIEVE IS DISCARDED. USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718. USE A 6-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 56 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: PR0/50

	WATER ADDED	(ml)	500	100	200	300	400
A	WT. OF SOIL & MOLD	(grams)	11,612.16	11,067.8	11,249.3	11,657.5	11,702.7
B	WT. OF MOLD	(grams)	6627.4	6627.4	6627.4	6627.4	6627.4
C	WT. OF SOIL = A - B	(grams)	4984.8	4440.4	4621.9	5030.1	5075.5
D	WET UNIT WT. ⁽¹⁾ = C X 0.029	(pcf)	144.6	128.8	134.0	145.9	147.2
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	130.4	126.2	128.2	136.5	135.0

NOTE: IF CALIBRATED MOLD OF 1/3.333 FT³ IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (13.333/453.6) = 0.029). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/3.333 ± 0.0009 FT³ ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: PR0/50

	TARE NO.		C	12	10	14	D
F	WT. OF TARE	(grams)	13.9	2.1	7.2	7.6	13.8
G	WT. OF WET SOIL & TARE	(grams)	271.4	213.5	268.5	247.4	235.2
H	WT. OF DRY SOIL & TARE	(grams)	246.0	209.2	257.2	233.8	217.0
I	WT. OF WATER = G - H	(grams)	25.4	4.3	11.3	15.6	18.2
J	WT. DRY SOIL = H - F	(grams)	232.1	207.1	250.0	226.2	203.2
K	MOISTURE CONTENT = (I/J) X 100	(%)	10.9	2.1	4.5	6.9	9.0



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

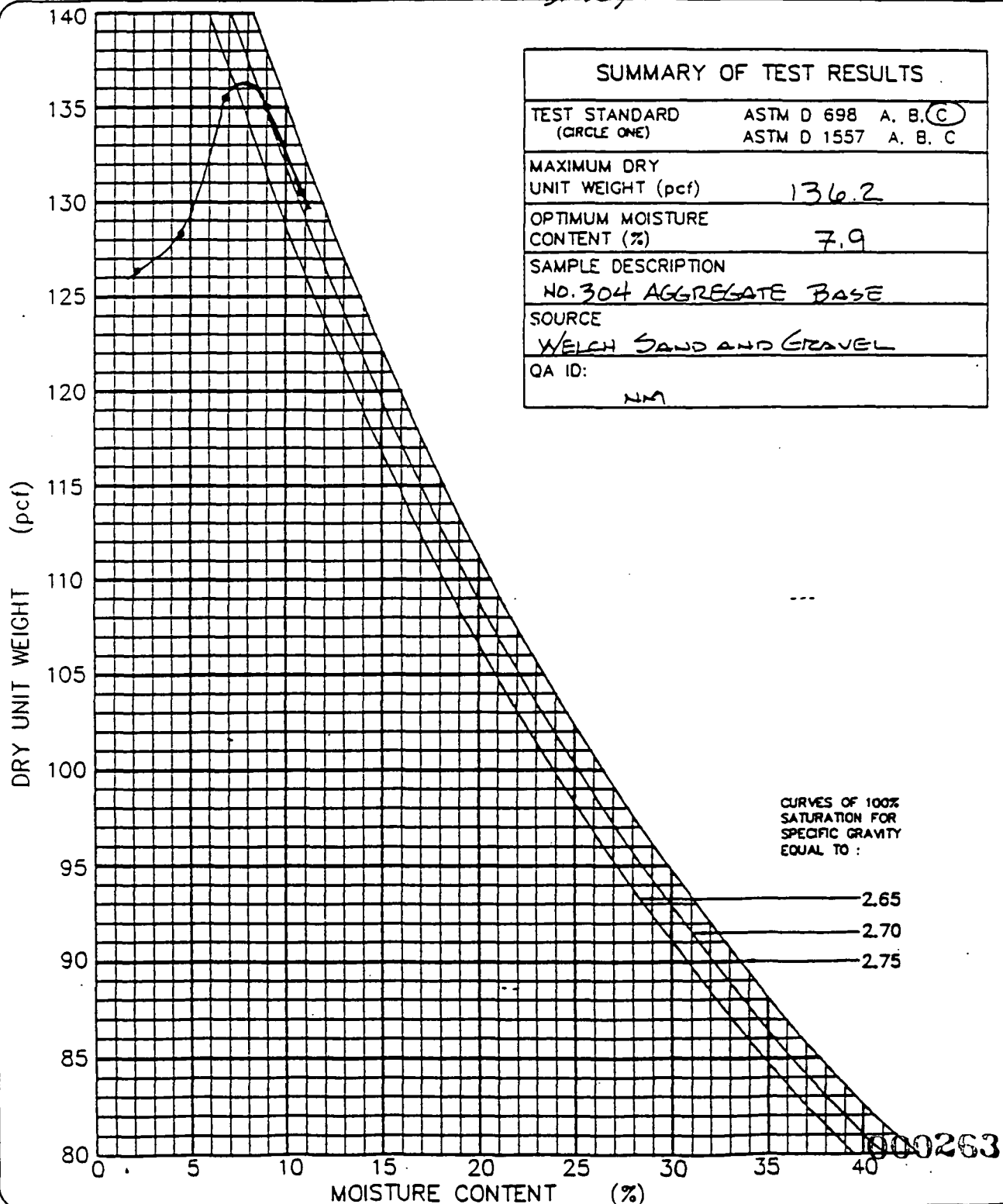
LOCATION: FERNALD, OHIO

PROJECT NO: GQ0166 TASK NO.: 04.1

DESCRIPTION: LCS CONSTRUCTION

DATE: 03 day JULY month 1997 ye

MATERIAL TYPE: ROAD BASE (NO. 304 AGGREGATE) SAMPLE NO.: YRB-01





GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)LOCATION: FERNALD, OHIOPROJECT NO.: GQ0166 TASK NO.: 04.1DESCRIPTION: IMPACTED MATERIALS HAUL ROAD AND ACCESS CORRIDOR CONSTRUCTEDDATE: 22 day 12 month 97 year

SPECIFICATION REQUIREMENTS

SOURCE: WELCH SAND AND GRAVEL MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY / OTHER #304 SAND LIFT THICKNESS (LOOSE/COMPACTED): 12"
(CIRCLE ONE) 12"% COMPACTION: ≥ 98% MOISTURE RANGE: — ASTM D 698: D(C) ASTM D 1557: A B C
(CIRCLE ONE) D(C)NUCLEAR GAUGE TYPE: TROXLER JY30 NUCLEAR GAUGE SERIAL NO. 27418 COR. FACTOR: — QA ID: 58

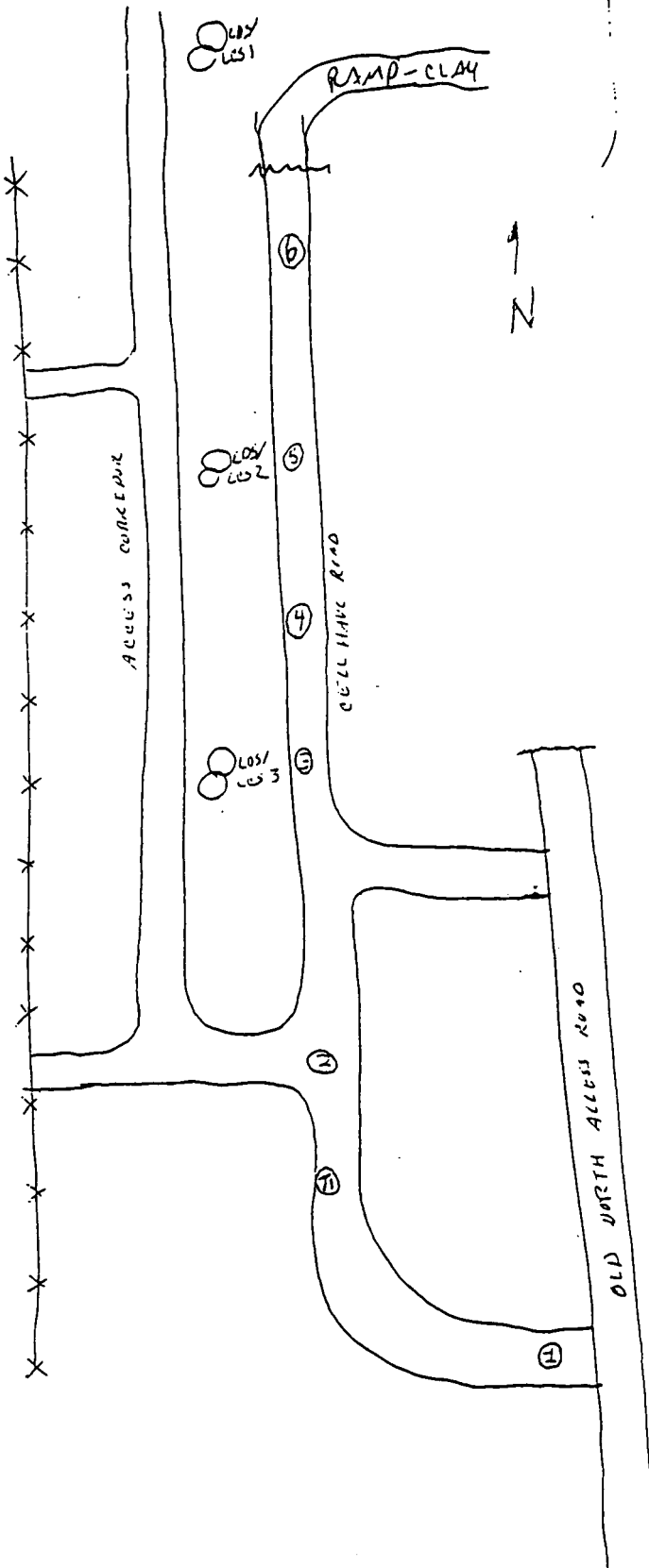
TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS							RETEST NO.		RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	PASS			FAIL	
1	SEE ATTACHED MAP	BACKL2	T 1	4.7	135.4	4.9	143.3	136.7	100.9	P						
2	↓	BACKL2	↓	↓	↓	5.6	128.3	121.5	89.7		F	*				
3	↓	↓	↓	↓	↓	5.6	140.8	133.3	98.4	P						
4	↓	↓	↓	↓	↓	5.0	136.7	130.2	96.1		F	*				
5	↓	↓	↓	↓	↓	5.9	135.1	127.6	94.3		F	*				
6	↓	↓	↓	↓	↓	5.4	124.8	118.4	87.5		F	*				

COMMENTS: NOTE: FAILED AREAS TO BE REMOVED AT A LATER DATE AS TIME AND WEATHER ALLOW

* SEE ATTACHED MEMORANDUM (NO FURTHER RETEST ARE REQUIRED)

000264

2064



52-1000-97

22 DECEMBER 1997

#304 STONE ROAD BED COMPACTION

TEST LOCATION SKETCH

000265

M E M O R A N D U M

TO: File

FROM: Brian Erisman

DATE: 17 March, 1998

SUBJECT: Failed Nuclear Density tests
Fernald Environmental Management Project
Fernald, Ohio

As per section 02200 of the Phase I contract specifications, 3.09 part C the tested and failed portions of the surface lift of placed and compacted #304 stone were documented and delineated.

On 09 February 1998, Petro Environmental Technologies (PET) excavated the surface lift from the entire access road in efforts to remove contaminants possibly accrued during the transportation of impacted materials from the east stockpile to the OSDF.

* * * * *

Copy to: File

GQ0166/.DOC

000266



GeoSYNTEC CONSULTANTS

FLUOR DANIEL
FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04

DESCRIPTION: PHASE II CONSTRUCTION

DATE: 20 day Nov month 98 year

SPECIFICATION REQUIREMENTS

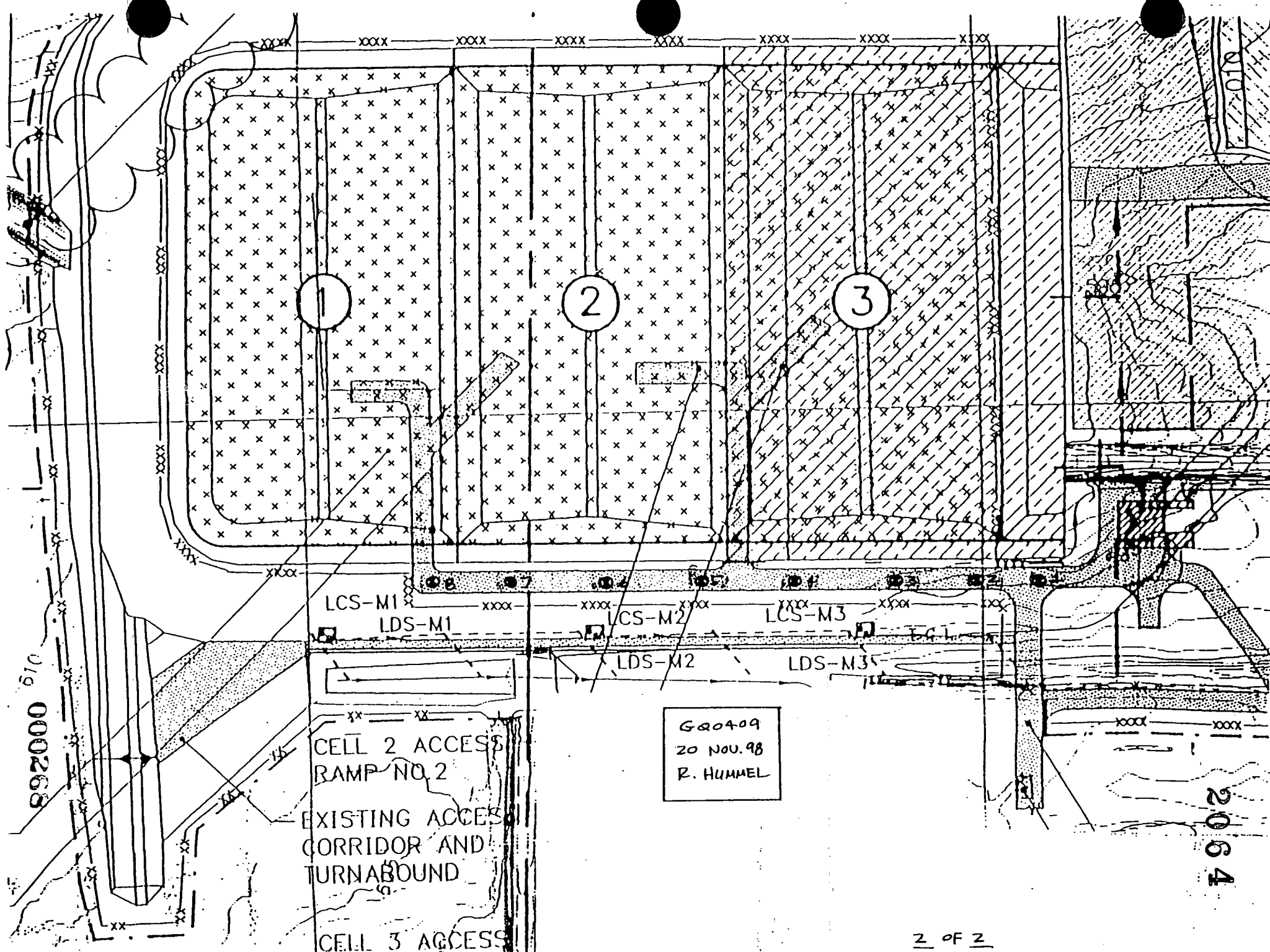
SOURCE: ~~ON-SITE STOCKPILE~~ #304 stone MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY / OTHER: LIFT THICKNESS (LOOSE/COMPACTED):

% COMPACTION: 98% MOISTURE RANGE: N/A ASTM D 698: A B C / ASTM D 1557: A B C

NUCLEAR GAUGE TYPE: TROXLER 3440 NUCLEAR GAUGE SERIAL NO. #28800 COR. FACTOR: N/A QA ID: PH

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
Road-1	WEST IMPACTED HAUL ROAD.	6"	UBR-01	7.9	136.2	6.2	149.4	140.0	103.2	✓				
2		6"				7.2	146.9	137.1	100.6	✓				
3		6"				6.7	150.2	140.8	103.3	✓				
4		6"				4.2	144.2	138.4	101.6	✓				
5		6"				6.8	147.6	138.2	101.4	✓				
6		6"				4.1	146.3	140.5	103.2	✓				
7		6"				4.2	150.9	144.8	106.3	✓				
8		6"				4.2	143.3	137.5	101.0	✓				

COMMENTS: Impacted material Haul Road base and subbase material is #304 stone. Haul road has been compacted with vibratory smooth drum and daily with loaded haul trucks traveling to Cells 1 and 2. Road very dense and contaminated with TM from truck wheels.





GeoSYNTEC CONSULTANTS

FLUOR DANIEL
FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04.1

DESCRIPTION: Phase I / Phase II

DATE: 7 day Dec month 1998 year

SPECIFICATION REQUIREMENTS

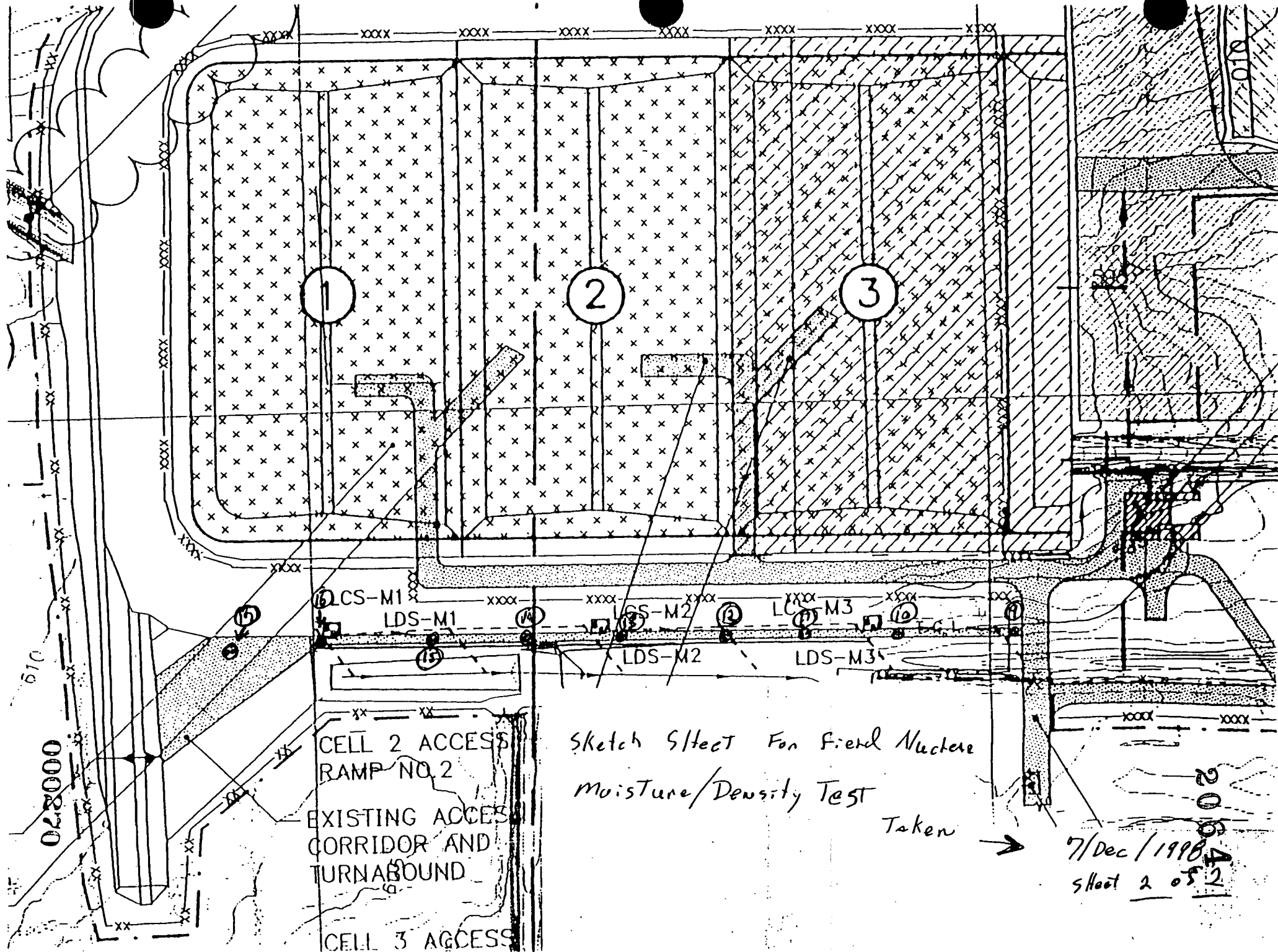
SOURCE: #304 stone MATERIAL TYPE: FILL / SUBGRADE (SUBBASE) / CLAY / OTHER Access Condition LIFT THICKNESS (LOOSE/COMPACTED):

% COMPACTION: 98% MOISTURE RANGE: ASTM D 698: A B C ASTM D 1557: A B C

NUCLEAR GAUGE TYPE: 3440 NUCLEAR GAUGE SERIAL NO. 20979 COR. FACTOR: N/A QA ID: DLR

TEST NO.	TEST LOCATION	PROBE DEPTH / LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
Road-9	See Attached Map	6" Top	VBR-01	7.9	136.2	2.6	147.8	144.1	105.8	✓				
10	Sketch street					2.1	134.4	131.6	96.6		✓	Road-24	✓	
11						2.8	123.9	120.5	88.5		✓	Road-25	✓	
12						1.6	137.1	135.0	99.1	✓				
13						2.0	139.8	137.1	100.7	✓				
14						2.1	131.7	129.0	94.7		✓	Road-26	✓	
15						2.5	137.7	134.8	98.4	✓				
16						2.2	139.6	136.6	100.3	✓				
17						3.1	145.6	141.2	103.7	✓				

COMMENTS: Retests occurred after recompaction. 063





GEOSYNTEC CONSULTANTS



FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04

DESCRIPTION: OSDF - OPTION 1

DATE: 10 day DEC. month 98 year

SPECIFICATION REQUIREMENTS

SOURCE: _____ MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY / OTHER Access Corridor LIFT THICKNESS (LOOSE/COMPACTED): _____

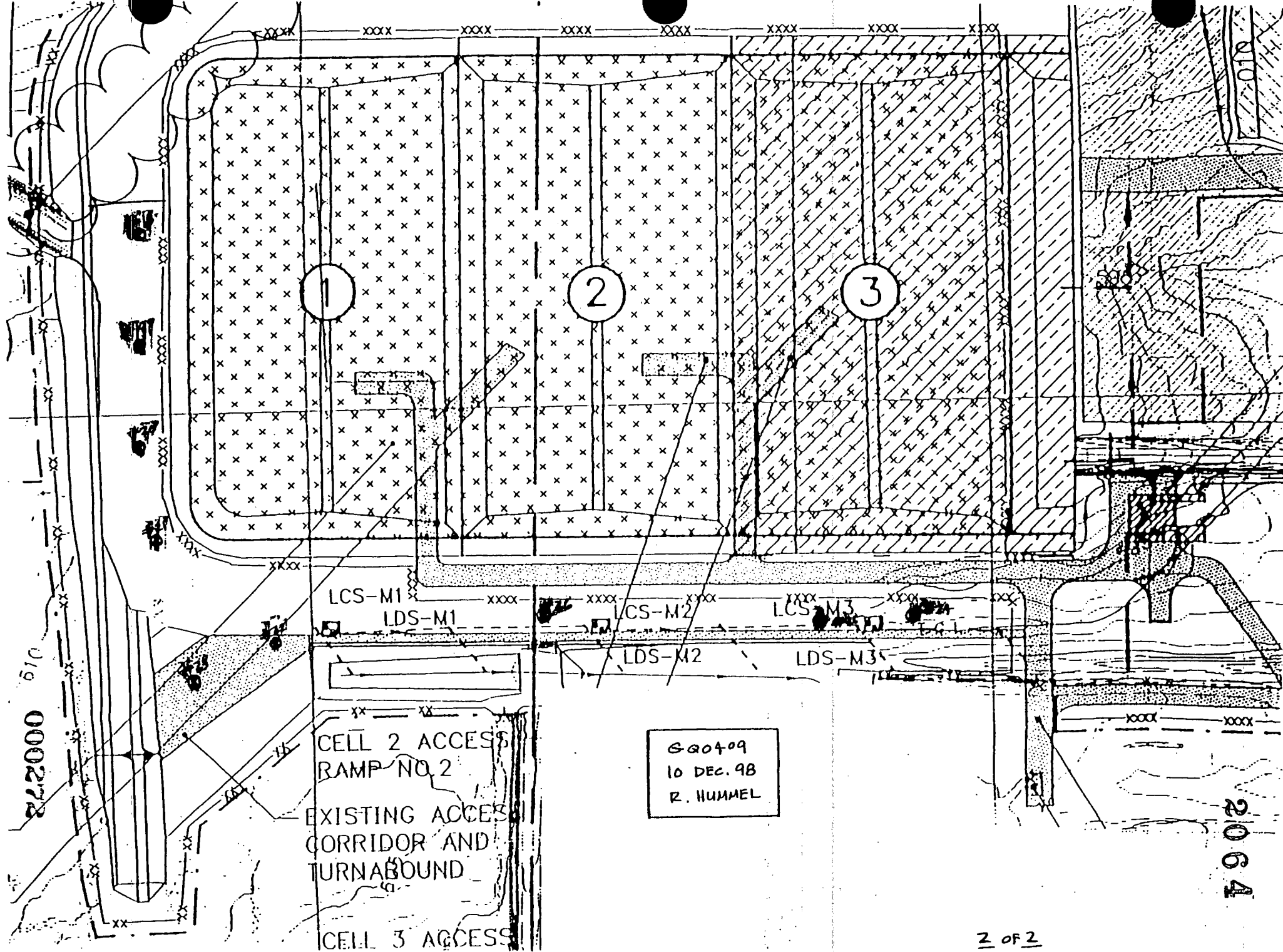
% COMPACTION: 98% MOISTURE RANGE: N/A ASTM D 698: A B C / ASTM D 1557: A B C _____
(CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3440 NUCLEAR GAUGE SERIAL NO. 20979 COR. FACTOR: N/A QA ID: RPH

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
ROAD #18	NORTH ACCESS ROAD AND TURNAROUND ACCESS CORRIDOR (SEE ATTACHED SKETCH)	6" / GRADE	VBR - 01	7.9 %	136.2	4.2	140.7	135.0	99.1	✓				
#19						3.7	145.2	140.0	102.8	✓				
#20						3.8	140.2	135.1	99.2	✓				
#21						3.5	138.7	134.0	98.4	✓				
#22						3.0	138.6	134.5	98.8	✓				
#23						4.3	141.6	135.7	99.1	✓				
#24						3.3	143.7	139.1	102.1	✓		#10	✓	
#25						3.8	140.7	135.3	99.3	✓		#11	✓	
#26						3.3	144.8	140.2	103.0	✓	#14	✓		

COMMENTS:

010 000278



CELL 2 ACCESS
RAMP NO. 2
EXISTING ACCESS
CORRIDOR AND
TURNABOUND
CELL 3 ACCESS

G00409
10 DEC. 98
R. HUMMEL

FIGURE 1



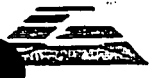
GeoSyntec Consultants

Page 1 of 1

CONSTRUCTION NONCONFORMANCE REPORT

1 ORIGINATOR: <i>Daniel Bodine</i>	2 TITLE/ORGANIZATION: <i>GeoSyntec</i>	3 NCR NUMBER: <i>1702-012</i>	4 DATE DISCOVERED: <i>18 Dec. 1998</i> <i>Pas</i>
5 RESPONSIBLE ORGANIZATION/PROJECT: <i>GeoSyntec Consultants</i>		6 ASSESSMENT ACTIVITY: <i>Construction Quality Control</i>	7 HOLD TAG: () YES <input checked="" type="checkbox"/> NO 8 REMOVED (Initial/Date):
9 REQUIREMENTS (Identify requirement from document [e.g., CQA plan, specification, drawing, etc.]): <i>Specification Section 02250 Rev. 0 Part 3.02.A requires the moisture content and dry density of clay liner/cap material to fall within the AP2 as defined in Part 3.02.A. The moisture content shall result in a degree of saturation of at least 90 i.e. the left boundary of the AP2 is defined by the 90% degree of saturation line. Also moisture content shall be 0 to +3% of laboratory optimum water content (ASTM D 698)</i>			
10 NONCONFORMANCE TYPE: <input checked="" type="checkbox"/> Construction Nonconformance <input type="checkbox"/> Material Deviation ()			
11 NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required): <i>C&C evaluated Field densities incorrectly for Phase 1 and Phase 1 Change Order work for clay liner/cap on 29 April 12-15 May 1998, 22 May 1998, 27 May 1998 and 8 June 1998. C&C Site Manager mistakenly implemented the "line of optimum" method for determining the left boundary of the AP2. For Cell 1 clay wedge 47 of 74 tests were evaluated incorrectly and after re-evaluation 10 tests fall outside of</i>			
12 ORIGINATOR'S SIGNATURE: <i>Daniel Bodine</i>		13 DATE PROVIDED TO RESPONSIBLE MANAGER: <i>12 Dec. 1998</i>	
14 RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION: <div style="display: flex; justify-content: space-between;"> Use As-Is <input checked="" type="checkbox"/> Reject () Other () </div> <div style="display: flex; justify-content: space-between;"> Repair () Rework () </div> <i>Clay for the Phase 1 (1998) and Phase 1 Change Order Work came from an onsite leftover stockpile. C&C performed modified and standard proctors (#330 #331 #332) to arrive at a combined proctor and AP2 modified with the line of optimum as the left boundary. Summarized AP2 plots attached. The (10+4) 14 tests are passing if the "line of optimum" method for determining the left boundary is implemented. Base</i>			
15 RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION): <i>Daniel G Bodine Project Manager GeoSyntec</i>			
16 RESPONSIBLE MANAGER'S SIGNATURE: <i>Daniel Bodine</i>		17 PROPOSED COMPLETION DATE: <i>14 Dec. 98</i>	18 DATE FORWARDED TO APPROVAL AUTHORITY: <i>12 Dec. 98</i>

000273



GeoSyntec Consultants

Page 2 of 2

CONSTRUCTION NONCONFORMANCE REPORT

EVALUATION OF PROPOSED CORRECTIVE ACTION: Comments (X)		Accept (X)	Reject ()
<p>Two at tests for the cell 1 clay wedge (W-42 and W-55) that met the minimum 95% standard compaction requirement fall outside the APZ when evaluated using the line of optimums method. It is not clear if these, and other, tests actually fall within the wedge layer ② that requires use of the APZ. In future I will require that all clay wedge testing tests include accurate elevation and plan location using dimensions.</p>			
APPROVAL AUTHORITY SIGNATURE:		DATE:	
		14 Dec. 98	
VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):			
<p>the APZ - F For future testing of the clay wedge the site C&C manager will implement an separate test location system that will clearly allow the technician to determine if questionable tests fall inside or outside of wedge layer ② (see Drawing 90X-G000-B00215 Sheet G-22B).</p>			
VERIFIER'S SIGNATURE:		DATE:	
		14 Dec 1998	
APPROVAL AUTHORITY SIGNATURE:		DATE CLOSED:	
		14 Dec 98	
CONTINUATION FROM BLOCK 11/14			
<p>① The APZ. For Cell 2 clay liner on the west slope 17 of 17 tests were evaluated incorrectly and after re-evaluation 4 tests fall outside of the APZ. Also 6 additional passing tests had moisture contents slightly above the +3% of optimum moisture criterion. All affected test reports have been attached.</p>			
<p>② on this and the approval of the Test Pad Program Final Report Addendum No. 1, Rev 0. Attached USEPA Approval letter, recommending use of the line of optimums, The tests should be used as is. Laboratory permeability for the material tested covered by stockpile 13 (end of 1997) and 98-1 (beginning of 1998 including left over 13). The 6 tests (W-21, W-24, W-41, W-42, W-43 and W-44) should have been included with the evaluation under NRC 20102-002 which has been accepted as use as is. Therefore use as is.</p>			

000274



GEO SYNTec CONSULTANTS

FLUOR DANIEL
FERNALD

MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

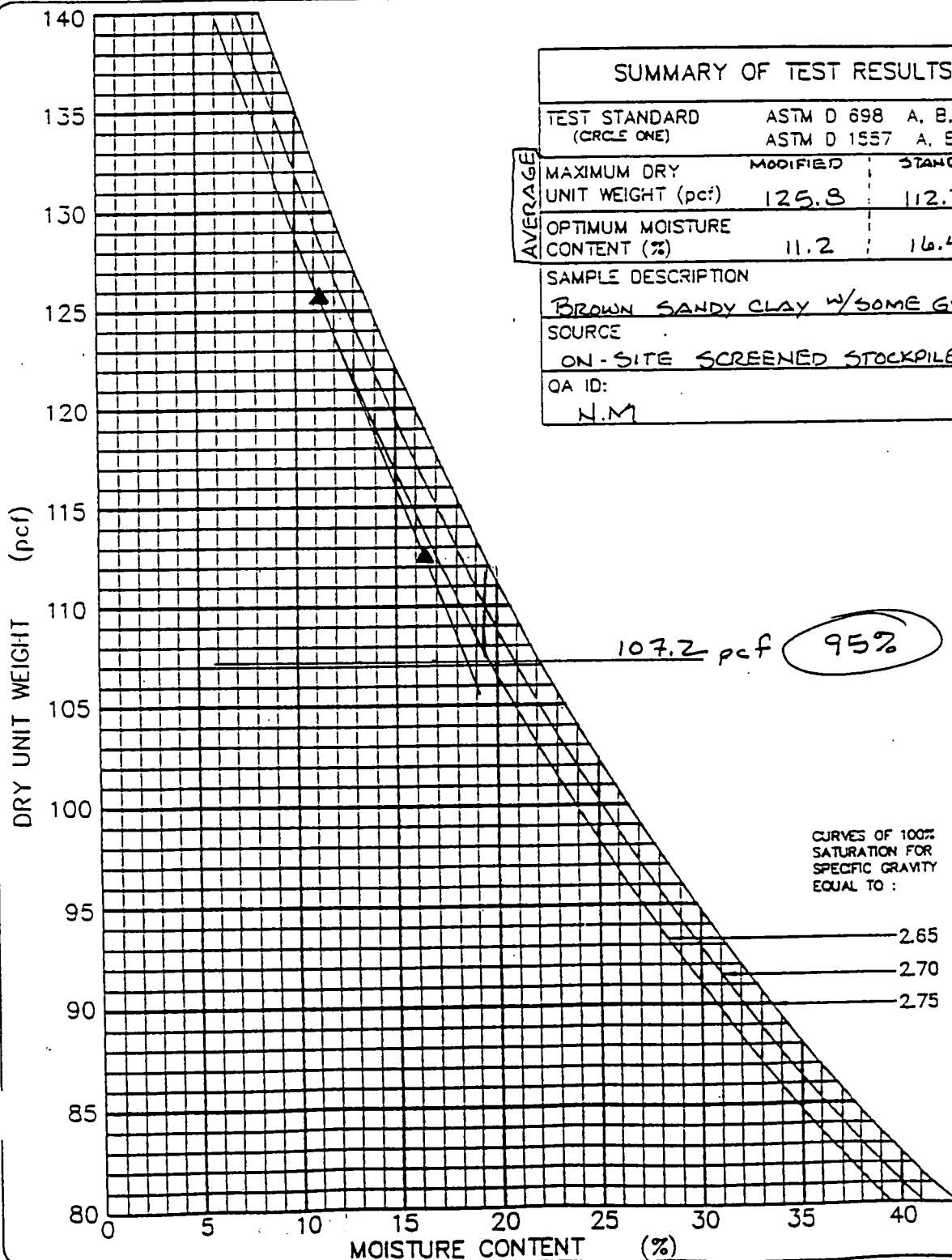
PROJECT NO: GQ0409 TASK NO.: 04.1

DESCRIPTION: Phase one

DATE: 20 day APR. month 1998 year

MATERIAL TYPE: CLAY LINER

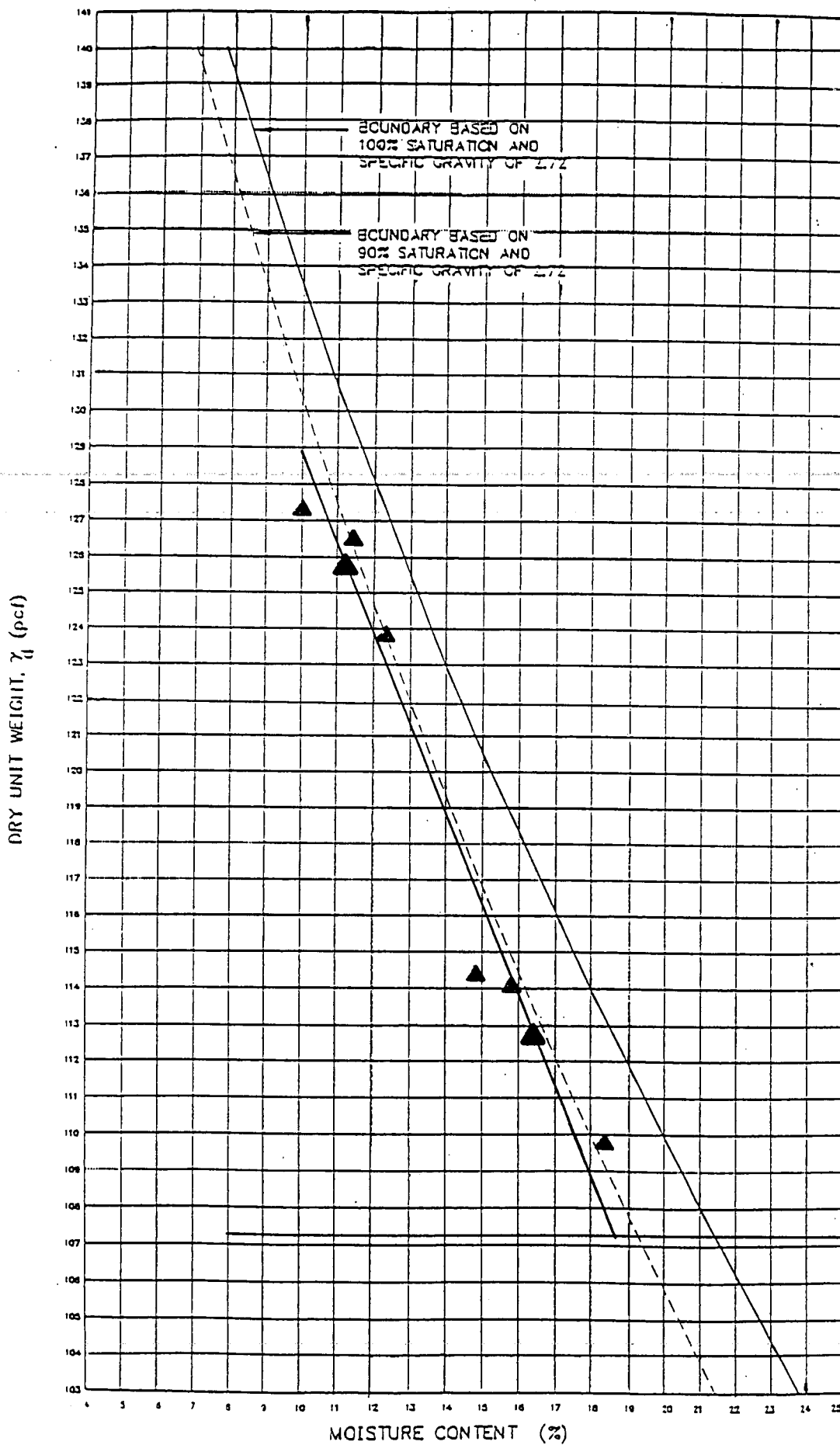
SAMPLE NO.: LP-329, 330, 331 COMBINED



SUMMARY OF TEST RESULTS

AVERAGE	TEST STANDARD (CIRCLE ONE)	ASTM D 698	A, B, C
		ASTM D 1557	A, B, C
		MODIFIED	STANDARD
	MAXIMUM DRY UNIT WEIGHT (pcf)	125.8	112.7
	OPTIMUM MOISTURE CONTENT (%)	11.2	16.4
SAMPLE DESCRIPTION			
BROWN SANDY CLAY w/SOME GVL.			
SOURCE			
ON-SITE SCREENED STOCKPILE			
QA ID:			
N.M.			

000275



1012 pcf
95%
of STD

Written by: Collin SukoenDate: / /
YY MM DDReviewed by: P. BudinDate: 28 / 10 / 14
YY MM DDClient: FDFProject: OSDF Phase IIProject/Proposal No: 600409Task No: 01

	Modified Proctor			Standard Proctor		
Sample No						
Max	123.9	127.2	126.3	109.8	114.4	114.0
Wopt	12.3	10.0	11.4	18.3	14.9	15.9
Average	125.8 lb/ft ³			112.7 lb/ft ³		
Wopt	11.2 %			16.4 %		
95% of Standard Proctor	=			107.1 lb/ft ³		
See Plot of Data						



FIELD NUCLEAR MOISTURE/DENSITY TEST LOG (ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase I Constr. (change order 25C)

PROJECT NO.: GQ0409 TASK NO.: 04

DATE: 22 day May month 1998 year

SPECIFICATION REQUIREMENTS

SOURCE: on site stockpile MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY / OTHER: _____ LIFT THICKNESS (LOOSE COMPACTED): 6"

% COMPACTION: 95% MOISTURE RANGE: APZ ASTM D 698: (A) B C / ASTM D 1557: A B C

NUCLEAR GAUGE TYPE: Troxler 3440 NUCLEAR GAUGE SERIAL NO. 20709 COR. FACTOR: 2% QA ID: RP

[illegible]

COMMENTS:

④ Avg. value of LP-324, LP-330, LP-331



**FLUOR DANIEL
FERNALD** 

(ASTM D 3017 AND ASTM D 2922)

DATE: 27 day May month 1998 year

NUCLEAR GAUGE TYPE: Troxler 3430 NUCLEAR GAUGE SERIAL NO. 27418 COR. FACTOR: 2% QA ID: RP/BE

[illegible]

④ Avg value of LP-329, LP-330, & LP-331



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04

DESCRIPTION: OSDF - one year option

DATE: 08 day June month 1998 year

SPECIFICATION REQUIREMENTS

SOURCE: on site stockpile MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY OTHER: _____ LIFT THICKNESS (LOOSE / COMPACTED) 6"

% COMPACTION: 95% MOISTURE RANGE: AP2 ASTM D 698: A B C / ASTM D 1557: A B C

NUCLEAR GAUGE TYPE: Troxler 3430 NUCLEAR GAUGE SERIAL NO. 27418 COR. FACTOR: 2% QA ID: RP

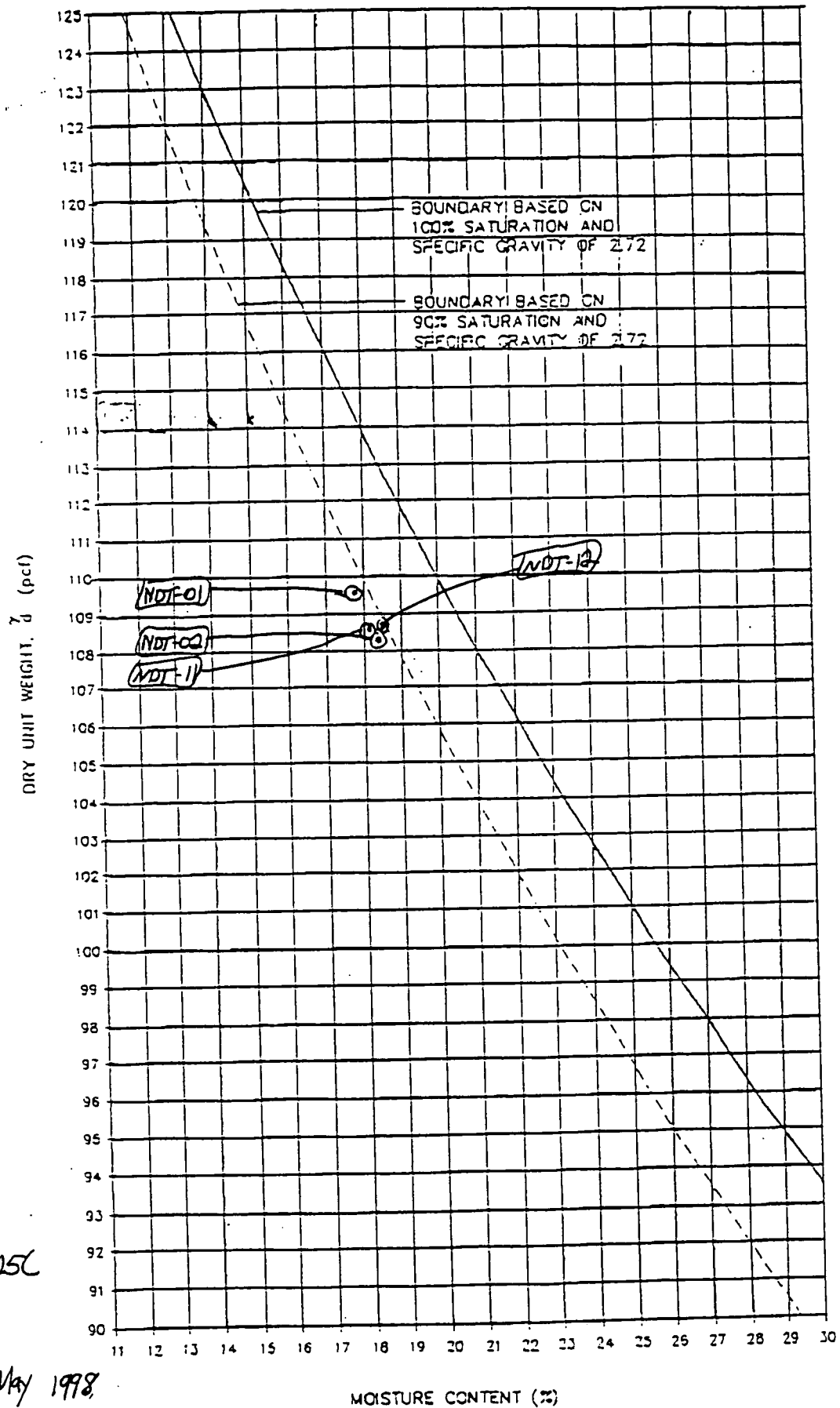
TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
NDT-11	see sketch ↓ ↓ ↓ ↓ ↓ ↓	6"/1	*	16.4	112.7	18.1	128.1	108.5	96.3	X	F	NCR-1702-012		
NDT-12		6"/2	↓	↓	↓	18.5	128.7	108.6	96.4	R	P	NCR-1702-012		
NDT-13		6"/3	↓	↓	↓	17.7	130.6	111.0	98.5	P				
NDT-14		6"/4	↓	↓	↓	19.1	129.6	108.8	96.6	P				
NDT-15		6"/5	↓	↓	↓	19.2	130.0	109.1	96.8	P				
NDT-16		6"/6	↓	↓	↓	19.6	128.3	107.2	95.0	P		NCR-1702-012		
NDT-17		6"/7	↓	↓	↓	17.8	130.1	110.4	98.0	P				

COMMENTS:

* AVG VALUE OF LP-329, 330, 331

000280

2064



Phase I
Change Order 25C

22 May 1998
to 08 June 1998

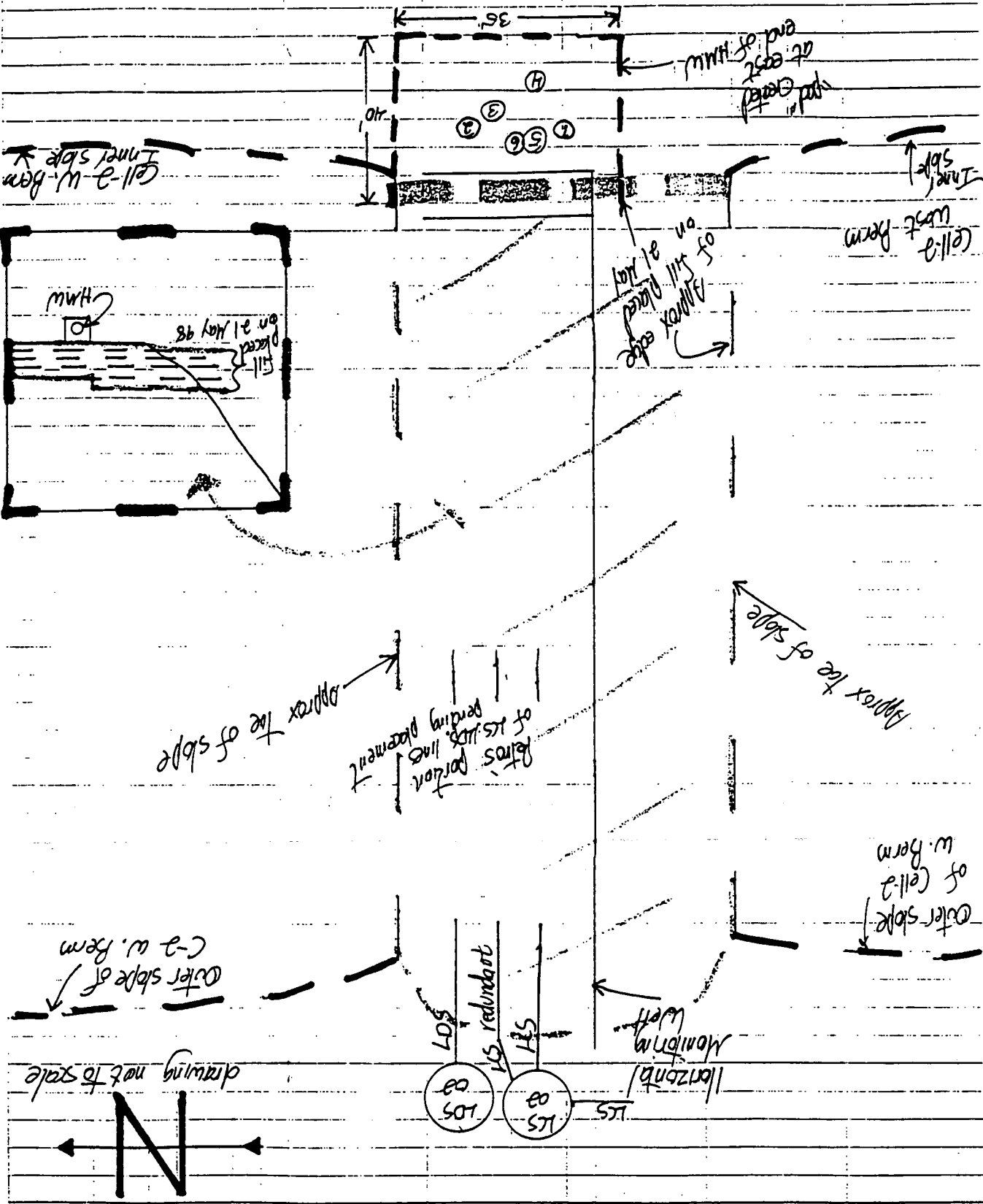
000281

Written by: *Rob Redford*

Date: *95/May/97* Reviewed by: *MM/DD*

Client: *EDF* Project: *Phase I Const. (change order)* Project/Proposal No.: *660409* Task No.: *041*

Date: *YY MM DD*



Written by: Rob Reddicord

Date: 05/06/08

Reviewed by: CPM

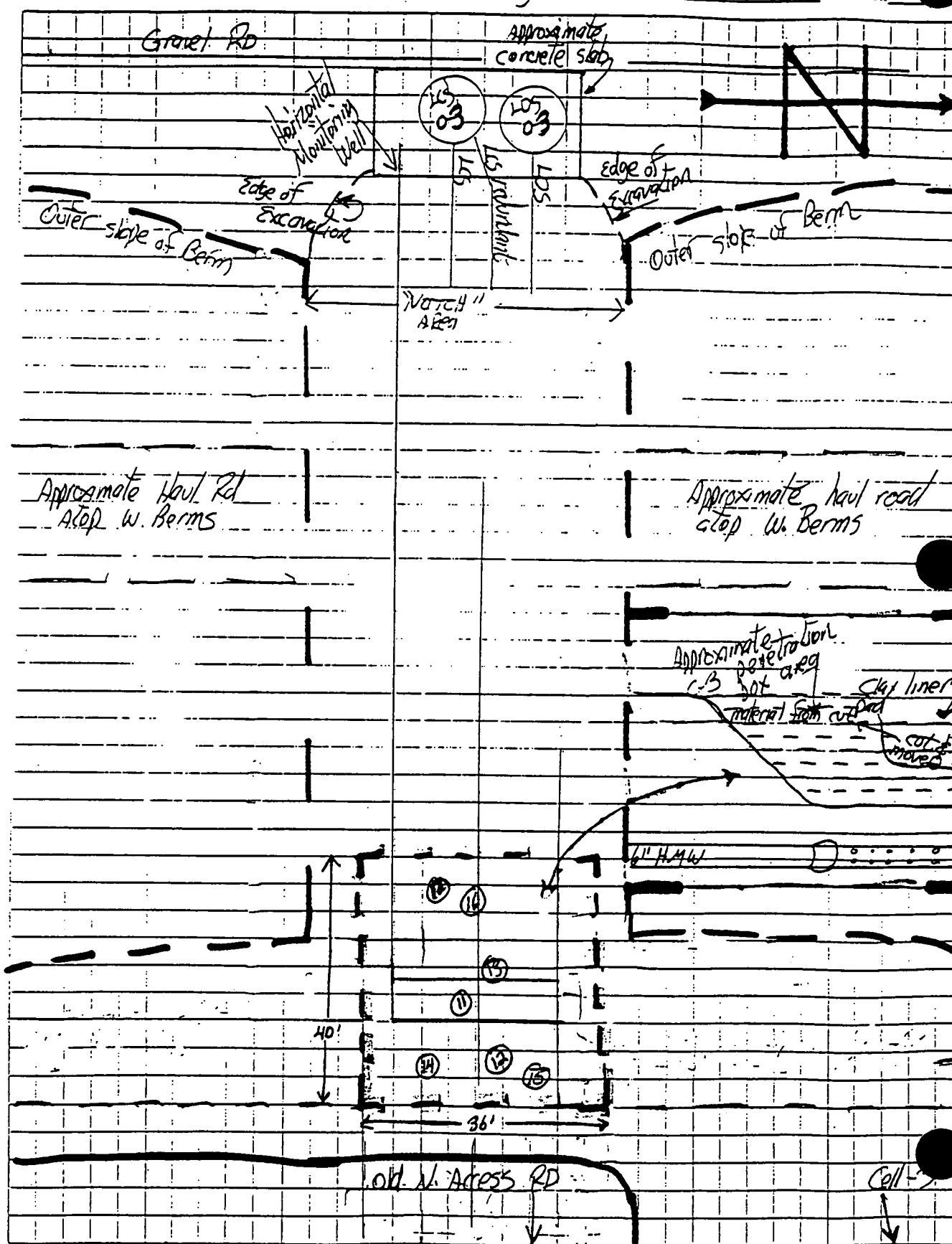
Date: YY/MM/DD

Client: FDF

Project: OSDF ONE YARDION (CHANGE OVER 257)

Project/Proposal No.: 600409

Task No.: 0



drawing not to scale

000283





GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04-1

DESCRIPTION: Phase I Constr.

DATE: 29 day Apr month 1998 year

SPECIFICATION REQUIREMENTS

SOURCE: on site stockpile MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY OTHER: _____ LIFT THICKNESS (LOOSE COMPACTED) 8"
(CIRCLE ONE)

% COMPACTION: 95% MOISTURE RANGE: AP2 ASTM D 698: A B C / ASTM D 1557: A B C
(CIRCLE ONE)

NUCLEAR GAUGE TYPE: Troxler 3440 NUCLEAR GAUGE SERIAL NO. 20709 COR. FACTOR: 2% QA ID: RP

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
W-19	see sketch	8"/2	⊗	16.4	112.7	17.6	129.7	110.3	98.0	<u>RP</u>	F	NCR 1702 012		
W-20	↓	↓	↓	↓	↓	18.6	127.3	107.3	95.0	<u>RP</u>	F	NCR 1702 012		
W-21	↓	↓	↓	↓	↓	19.9	130.7	104.0	96.7	P		NCR 1702 012		
W-22	↓	↓	↓	↓	↓	18.1	132.7	112.4	100	P				
W-23	↓	↓	↓	↓	↓	19.4	131.7	110.3	98	P				
W-24	↓	↓	↓	↓	↓	20.2	130.9	108.9	96.6	P		NCR 1702 012		
W-25	↓	↓	↓	↓	↓	19.3	129.3	108.3	96.2	P				
W-26	↓	↓	↓	↓	↓	19.4	129.4	108.4	96.3	P				

COMMENTS:

⊗ AVG. VALUE for screened stockpile (LP-330, LP-331, LP-332)

000284

2064



GeoSYNTEC CONSULTANTS



FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04

DESCRIPTION: OSDA - option year 1 / Phase I

DATE: 12 day May month 98 year

SPECIFICATION REQUIREMENTS

SOURCE: _____ MATERIAL TYPE: FILL / SUBGRADE / SUBBASE (CLAY) / OTHER: _____ LIFT THICKNESS (LOOSE/COMPACTED): 10"
(CIRCLE ONE)

% COMPACTION: 95% MOISTURE RANGE: APZ* ASTM D 698 (A) B C / ASTM D 1557: A B C
(CIRCLE ONE)

NUCLEAR GAUGE TYPE: 3430 NUCLEAR GAUGE SERIAL NO. 27418 COR. FACTOR: +2% QA ID: CL

TEST NO.	TEST LOCATION	PROBE DEPTH / LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.		RETEST PASS FAIL	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL				
W-27	See sketch	8" / Layer 2 / Lift 1	*	16.4	112.7	18.4	130.6	110.3	97.9	P					
W-28		"				18.0	131.6	111.5	99.0	P					
W-29		"				17.2	130.3	111.2	98.6	P					
W-30		"				19.5	127.2	106.4	94.4	F					
W-31		8" / Layer 1 / Lift 1				16.9	128.7	110.1	97.7	P					
W-32		"				16.9	125.4	107.3	95.2	P					
W-33		8" / Layer 2 / Lift 2				17.2	129.8	110.8	98.3	P					
W-34		8" / Layer 1 / Lift 1				18.5	129.3	109.1	96.8	P					

COMMENTS: * W-31 & W-32 are first lift and do not follow the APZ, required $\pm 3\%$ of optimum and 95%
& W-34

AVERAGE VALUES FOR SCREENED STOCKPILE (Lifts 2, 331, 332)

582000



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase I Constr.

PROJECT NO.: GQ0409 TASK NO.: 04

DATE: 13 day May month 1998 year

SPECIFICATION REQUIREMENTS

SOURCE: on site stockpile MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER: _____ LIFT THICKNESS (LOOSE / COMPACTED): 10"

% COMPACTION: 95% MOISTURE RANGE: AP2 or #3% ASTM D 698: (A) B C / ASTM D 1557: A B C

NUCLEAR GAUGE TYPE: Model 3430 NUCLEAR GAUGE SERIAL NO. 27418 COR. FACTOR: 2% QA ID: RP

TEST NO.	TEST LOCATION	PROBE DEPTH / LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
W-35	see sketch ↓ ↓ ↓ ↓ ↓ ↓	8"/1	(X)	16.4	112.7	16.4	125.8	108.1	95.9	F	F	W-36	P	
W-36		↓				18.5	126.8	107.0 (107.5)	95.0 (95.4)	F	F	NR-012		
W-37		8"/1				19.0	127.5	107.1	95.0	F	F			
W-38		8"/1				22.8	126.5	103.0	91.4	F	F	W-41	P	
W-39						17.2	128.8	110.0	97.6	P	P	NR-012		
W-40						18.1	130.6	110.5	98.0	P	P			
W-41						14.5	128.2	107.2	95.0	P	P			

COMMENTS: TEST W-35 moisture value outside AP2. TEST W-38 moisture value outside AP2.
⊗ Avg. value for screened stockpiles (LP-330, LP-331, LP-332)

000286

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GEOSYNTEC CONSULTANTS



FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04

DESCRIPTION: Phase I Constr.

DATE: 14 day May month 1998 year

SPECIFICATION REQUIREMENTS

SOURCE: on site stockpile MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER: _____ LIFT THICKNESS (LOOSE) (COMPACTED): 10'

% COMPACTION: 95% MOISTURE RANGE: APZ ASTM D 698: (A) B C / ASTM D 1557: A B C

NUCLEAR GAUGE TYPE: Troxler 3430 NUCLEAR GAUGE SERIAL NO. 27418 COR. FACTOR: 2% QA ID: RP

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
W42	see sketch	8"/1	⊗	16.4	112.7	17.9	126.6	107.3	95.0	P	F	NCR 1762-012		
W43						22.3	115.9	94.8	84.0		F	W47	P	
W44						18.1	129.8	109.9	97.5	P				
W45						18.6	128.4	108.3	96.1	P	F	NCR 1762-012		
W46						17.1	129.6	110.8	98.3	P	F	NCR 1762-012		
W47						18.1	130.4	110.4	97.9	P				
W48						20.3	130.9	108.8	96.5	P				
W49						21.5	130.2	107.2	95.0	P				
W50						19.7	128.3	107.2	95.0	P				
W51						18.3	130.9	110.7	98.2	P				

COMMENTS:

⊗ Avg value for screened stockpiles (LP-330, LP-331, LP-332)

000287



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04.1

DESCRIPTION: Phase I Constr.

DATE: 15 day May month 1998 year

SPECIFICATION REQUIREMENTS

SOURCE: on site stockpile MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / (CLAY) / OTHER: _____ LIFT THICKNESS (LOOSE) / (COMPACTED): 10"
(CIRCLE ONE)

% COMPACTION: 95% MOISTURE RANGE: AP2 ASTM D 698: (A) B C / ASTM D 1557: A B C _____
(CIRCLE ONE)

NUCLEAR GAUGE TYPE: Troxler NUCLEAR GAUGE SERIAL NO. 27418 COR. FACTOR: 2% QA ID: RP

TEST NO.	TEST LOCATION	PROBE DEPTH / LIFT NO.	LAB RESULTS			FIELD TEST RESULTS					RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS / FAIL		PASS	FAIL
W52	see sketch ↓	8"/1 ↓	⊕	16.4	112.7	22.5	125.2	102.2	90.7%	F	W54	P	
W53			LP-333	13.4	129.3	16.8	128.4	109.9	91.4% 15 May 98 RP	F	W55	P	
W54			⊕	16.4	112.7	20.7	129.3	107.2	95.0%	P			
W55			LP-333	13.4	129.3	15.3	131.7	114.2	95.5% 15 May 98	F	NCR 1702 -012		
W56			↓	↓	↓	15.7	134.9	116.6	95.7% 15 May 98	P			
W57			↓	↓	↓	16.9	133.5	114.2	95.4% 15 May 98	P			
W58			⊕	16.4	112.7	18.9	128.6	108.2	96.0%	P			

COMMENTS: test W53 moisture value outside AP2
⊕ Avg value for screened stockpiles (LP-330, LP-331, LP-332)

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C 1. 0118 004 01K8

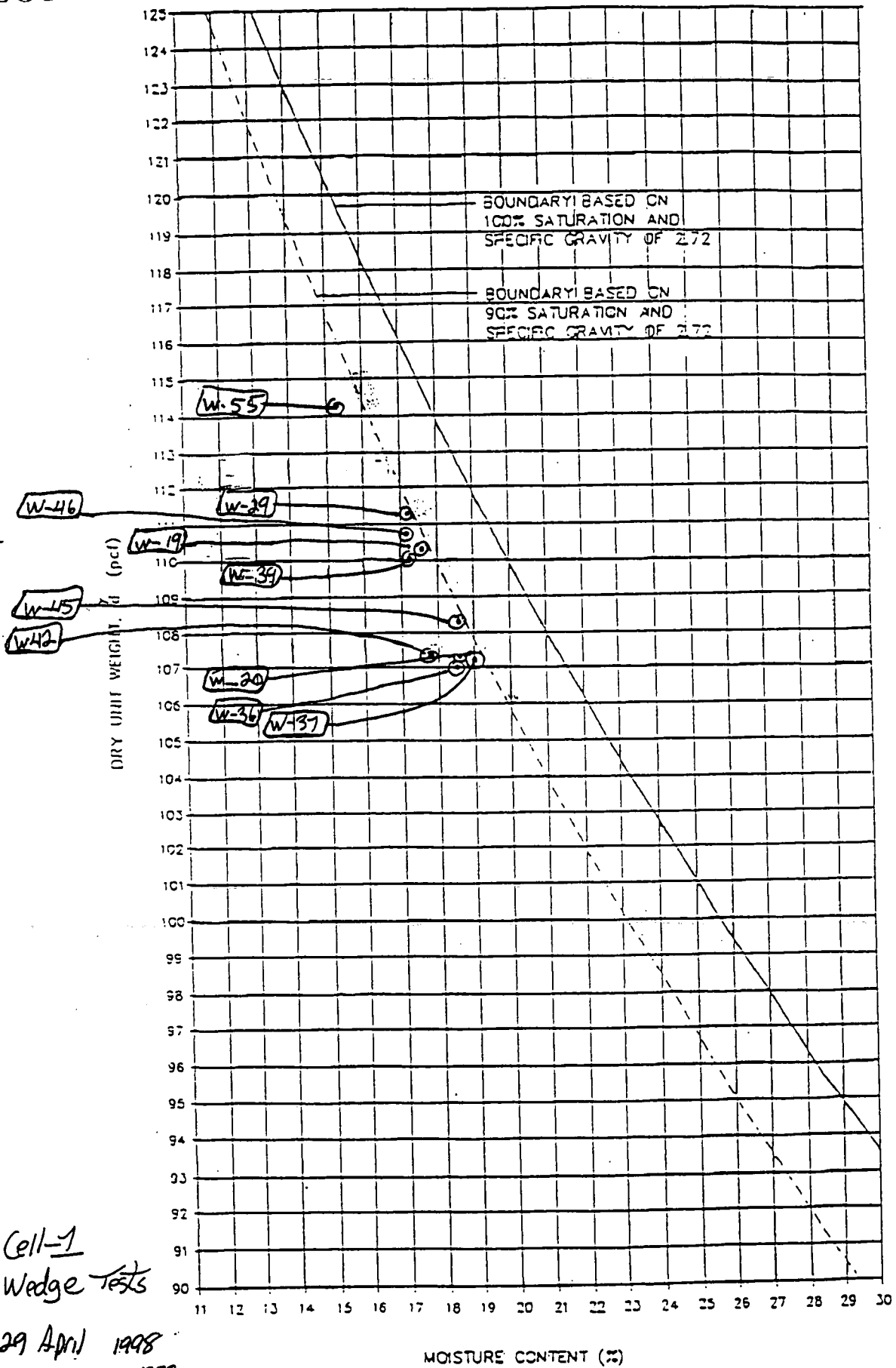
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[illegible]

CELL 1
CERTIFICATION POINTS
IDP, SY. STAT.

↑
NORTH

062000



Cell-1
Wedge Tests

29 April 1998
to 15 May 1998

sheet 4 of 4 2064



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

Hickey
Kuntz
Black
Bodine
File
LOG M-80

Dec 3 10 39 AM '98

FILE: 6446.3

LIBRARY: _____

REPLY TO THE ATTENTION OF _____

DEC 02 1998

RECEIVED
DEC 11 1998
SA

Mr. Johnny W. Reising
United States Department of Energy
Feed Materials Production Center
P.O. Box 398705
Cincinnati, Ohio 45239-8705

SRF-5J

RE: Test Pad Program
Addendum

Dear Mr. Reising:

The United States Environmental Protection Agency (U.S. EPA) has completed its review of the United States Department of Energy's (U.S. DOE) Test Pad Program Final Report (TPPFR) addendum number 1, On-Site Disposal Facility (OSDF), revision A document.

The document proposes modifications to Section 9 of the TPPFR based on variations of materials encountered and lessons learned during Phase I construction of the OSDF clay liner.

The lessons learned are categorized as follows: (1) line of optimum moisture content, (2) soil processing, and (3) construction quality control testing protocols. Based on the lessons learned during Phase I construction of the clay liner at the OSDF, the document recommends modifications to the TPPFR for oversized particle removal, borrow material preparation and placement procedures, and acceptable permeability zones for construction. These recommendations will be useful in constructing the remaining cells at the OSDF.

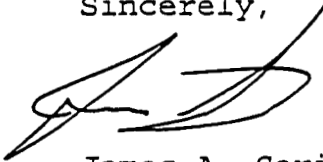
000291

-2-

Therefore, U.S. EPA concurs with the recommendations made for clay liner construction at the OSDF and the TPPFR addendum.

Please contact me at (312) 886-0992 if you have any questions regarding this matter.

Sincerely,



James A. Saric
Remedial Project Manager
Federal Facilities Section
SFD Remedial Response Branch #2

cc: Tom Schneider, OEPA-SWDO
Bill Murphie, U.S. DOE-HDQ
John Bradburne, FERMCO
Terry Hagen, FERMCO
Tom Walsh, FERMCO

2064

Fluor Daniel Fernald

000293

Fluor Daniel Fernald Nonconformance Report Log

NCR Number	Date Discovered	Project Activity	Responsible Dept. or Vendor	Originator	Description	Technical Concurrence/ Date	(Corrective Action Response) Responsible Team Leader/Date	(Eval. Corrective Action) Response Acceptable?/ Originator Signature	Verification Date	NCR Closure Date
FY98-0158	27-May-98	OSDF/PH 2	GeoSyntec	Mike Godber	There were 3 grids/lifts of impacted material that were not tested.	Dan Bodine				
FY99-0119	22-Sep-98	OSDF	GSE Lining Inc.	Jim Turner	No certification of minimum average roll values on any geotextiles nor long-term storage requirements were transmitted to FDF.	Dan Bodine	Mike Hickey 10 Nov 98	(Y) Jim Turner 10 Nov 98	Jim Turner 11/10/98	16-Nov-98
FY98-1556	31-Aug-98	Cell #2	GeoSyntec	Mike Godber	Proctor curve for sample LPII-94 from stockpile 98-9 was misdrawn.	John Berretz 9/11/98	Bill Zebick 9/11/98	(Y) Mike Godber	Mike Godber 9/17/98	9/18/98
FY98-1324	20-Jul-98	Desity tests on clay liner	GeoSyntec	Mike Godber	Test No. 2-9 had a calculated density result of 94.7%. GeoSyntec rounded the value up to 95%.	Jim Jenkins 7/28/98	Bill Zebick 7/28/98	(Y) Mike Godber	Muriel Vigus	8/4/98
FY98-1323	20-Jul-98	Dsty. on Comp. Fill Liner	GeoSyntec	Mike Godber	Test No. 444 had a calculated density result of 94.5%. GeoSyntec rounded the value up to 95%	Jim Jenkins 7/28/98	Bill Zebick 7/28/98	(Y) Mike Godber	Muriel Vigus	8/4/98
FY98-1168	5-May-98	OSDF/PH 1	OSDF	Mike Godber	On 05 May welding began on HDPE pipe for cell 2, and the certifications for the welders had not been submitted and approved.	M. Godber 5/7/98	Bill zebick 5/7/98	(Y) Mike Godber 5/7/98	Mike Godber 5/13/98	5/13/98
FY98-1224	28-May-98	HDPE Piping	Village Builders	Mike Godber	The stubouts for LDS and LCS redundant piping for cell 2 are out of round.					
FY98-1306	15-Jul-98	OSDF/PH 2	GeoSyntec	Mike Godber	The permeability and hydrometer test results have not been submitted on the clay liner material from stockpile 1, so therefore the material cannot be placed in the cell.	Bill Zebick 7/16/98	Bill Zebick 7/22/98	(Y) Mike Godber	Mike Godber 7/22/98	7/22/98

000294

NONCONFORMANCE REPORT FORM

ORIGINATOR/ASSESSOR		
1	Nonconformance Number/Revision	NCR No.: ^{Fr 10-22-98} FY98-99 - 0119 Revision No. 0
2	Dates	Date Discovered: September 22, 1998 Date NCR Report Issued: October 20, 1998
3	Type of Nonconformance	<input checked="" type="checkbox"/> FINDING <input type="checkbox"/> CONCERN ORIGINAL
4	Project/Activity @ Fac/Loc/Bldg	OSDF Project, Supplier Submittal Review at T39
5	Hazard Category	Nuclear: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> Radiological Non-Nuclear: <input type="checkbox"/> High Hazard <input type="checkbox"/> Moderate Hazard <input type="checkbox"/> Low Hazard Industrial: <input type="checkbox"/> Hazardous Waste Activity <input checked="" type="checkbox"/> Standard Industrial Hazard <input type="checkbox"/> FEMP SIH
6	Assessment	<input type="checkbox"/> Internal <input type="checkbox"/> External (OEPA, DOE) <input checked="" type="checkbox"/> Supplier/Vendor _____
7	Assessment Type	<input type="checkbox"/> Audit <input checked="" type="checkbox"/> Surveillance <input type="checkbox"/> Inspection <input type="checkbox"/> Other _____
8	Assessment Number	S98-0884/0885/0886
9	Responsible FDF Division/Vendor	<input type="checkbox"/> S&WP <input type="checkbox"/> WMT&SP <input type="checkbox"/> FC&DP <input type="checkbox"/> O&PI <input type="checkbox"/> PS <input checked="" type="checkbox"/> SUPPLIER/VENDOR
10	Responsible FDF Department/Vendor	OSDF Project / GSE Lining Systems, Inc. / Synthetic Industries, Inc.
11	Responsible Team Leader/Coach/Vendor (Print Name)	Mike Hickey / Rick Holbrook
12	Functional Area (NA for Vendors) (choose any that apply) (Ref. RM-0016)	<input checked="" type="checkbox"/> CM <input checked="" type="checkbox"/> ED <input type="checkbox"/> RD <input type="checkbox"/> MS <input checked="" type="checkbox"/> QA <input checked="" type="checkbox"/> AC <input type="checkbox"/> PM <input type="checkbox"/> PI <input type="checkbox"/> FM <input type="checkbox"/> EP <input type="checkbox"/> EW <input type="checkbox"/> MT <input type="checkbox"/> OP <input type="checkbox"/> PT <input type="checkbox"/> SE <input type="checkbox"/> TR <input checked="" type="checkbox"/> CT <input type="checkbox"/> HR <input type="checkbox"/> PC <input type="checkbox"/> EM <input type="checkbox"/> FP <input type="checkbox"/> NS <input type="checkbox"/> SH <input type="checkbox"/> RP
13	QA Criteria (choose one that applies Ref. RM-0012) Other Criteria (CONOPS, etc.) (not RM-0012 applicable)	<input type="checkbox"/> 1 Program <input type="checkbox"/> 2 Training <input type="checkbox"/> 3 Quality Improv. <input type="checkbox"/> 4 Document/Records <input type="checkbox"/> 5 Work process <input type="checkbox"/> 6 Design <input checked="" type="checkbox"/> 7 Procurement <input type="checkbox"/> 8 Inspect/Test <input type="checkbox"/> 9 Management Assessment <input type="checkbox"/> 10 Independent Assessment <input type="checkbox"/> Other
14	Requirement Description Cite the requirement (clearly, concisely, and completely) and its source, including document identification number, page and paragraph number. A copy of the document (or page of the document) in which the requirement appears may be attached or added to the NCR file. Use additional or separate sheets as necessary.	Submit the following to Fluor Daniel Fernald (FDF) for review with proposal for the project: 2.) certification of minimum average roll values (95 percent lower confidence limit) and the corresponding test procedures for all geotextile properties listed in Tables 02714P-1 through 02714P-3; and 4.) Recommended long-term storage requirements. (PHII Procurement Spec - Rev. 1, Section 02714P, Geotextile, p. 02714P-2, Section 1.04.A.2, 4 SUBMITTALS)
15	Nonconformance Description Describe the nonconformance. Include details such as supplier names, container numbers, purchase order, work order, or requisition numbers) and clearly describe the deviation from the written requirement. Use additional or separate sheets as necessary.	Nonconformance Title or Short Description: <u>No Geotextile Certs of MARV or long-term storage</u> Contrary to the requirement, no certification of minimum average roll values (MARV) on any geotextiles nor long-term storage requirements have been transmitted to FDF.
16	Tagging Required / Number of Tags	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Number of Tags: <u>N/A</u>
17	Originator/Assessor	Name: <u>James T. TURNER</u> Signature: <u>[Signature]</u> Date: <u>10-21-98</u>
ORIGINATOR'S/ASSESSOR'S TEAM LEADER'S/COACH'S REVIEW		
18	Originator's/Assessor's Team Leader/Coach	Name: <u>Frank B. THOMPSON</u> Signature: <u>[Signature]</u> Date: <u>10-22-98</u>
19	Response Date From Resp. Organ.	20 November 1998 (Reply within 20 working days)

000295

NONCONFORMANCE REPORT FORM

2004

RESPONSIBLE ORGANIZATION'S CORRECTIVE ACTION RESPONSE

	Nonconformance Number/Revision	FY98-77-C119, Rev. 0
20	Root Cause Analysis Provide documentation as attachment. Use additional or separate sheets as necessary	<input checked="" type="checkbox"/> YES Level 1 Cat. <input type="checkbox"/> 1H (human perf.) <input type="checkbox"/> 1N (nat. phenom/sabotage) <input type="checkbox"/> NO <input type="checkbox"/> 1E (equip.) <input type="checkbox"/> 1Z (other) TapRoot Cause Code(s) _____
21	Corrective Action (CA) Description and Disposition Describe the actions necessary to correct the nonconformance. Corrective actions must be detailed and complete. They must be written in a clear, concise, and verifiable manner. The corrective action plan must also include actions to prevent recurrence. Use additional or separate sheets as necessary. (A disposition of Accept-as-is or Repair REQUIRES a written Technical Concurrence/Justification below)	Hardware: <input checked="" type="checkbox"/> Accept-as-is <input checked="" type="checkbox"/> Repair <input type="checkbox"/> Rework <input type="checkbox"/> Reject Non-Hardware: <input type="checkbox"/> Other Synthetic Industries' letter of 10-30-98 (attached) establishes 87% conformance to its published values. Comparison of specification tables 0274P-1 through 0274P-3 (attached) yields positive comparison to Synthetic Industries' published MAX V values (attached). Long-term storage and packaging requirements cited in Synthetic Industries' Quality Control Manual 00-TECH-98 Rev. 1, p. 8.
22	Technical Concurrence/Justification (mark NA if not applicable)	Name: <u>Daniel Radice</u> Signature: <u>Daniel Radice</u> Date: <u>10 Nov. 98</u>
23	Was a Design Change Notice Required?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No DCN # _____ Date Issued _____
24	Was a SBDP Performed? Was a USQD Performed?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No SBDP # _____ Date Issued _____ <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No USQD # _____ Date Issued _____
25	Actions taken to Prevent Recurrence Use additional or separate sheets as necessary.	Better adherence to submittal process will improve supplier responsiveness
26	Proposed Completion Date For CA	Date: <u>11-10-98</u>
27	Responsible Team Leader/Coach/Vendor	Name: <u>Michael Hickey</u> Signature: <u>Michael Hickey</u> Date: <u>11/10/98</u>
EVALUATION OF THE CORRECTIVE ACTION RESPONSE BY THE ORIGINATOR/ASSESSOR		
28	Response Acceptable?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
29	Originator's/Assessor's	Name: <u>James T. Turner</u> Signature: <u>James T. Turner</u> Date: <u>10 Nov. 1998</u>
COMPLETION OF THE CORRECTIVE ACTIONS BY THE RESPONSIBLE ORGANIZATION		
30	Date Corrective Action Completed	Date: <u>11/10/98</u>
31	Responsible Team Leader/Coach/Vendor	Name: <u>Michael Hickey</u> Signature: <u>Michael Hickey</u> Date: <u>11/10/98</u>
VERIFICATION OF COMPLETED CORRECTIVE ACTIONS BY THE VERIFIER		
32	Verification Action (Describe what objective evidence was examined to verify completion of this action and attach documentation to the NCR)	See attached documentation.
	Verifier	Name: <u>James T. Turner</u> Signature: <u>James T. Turner</u> Date: <u>10 Nov 1998</u>
CLOSURE BY THE ASSESSOR'S VERIFIER'S TEAM LEADER/COACH		
34	Verifier's Team Leader/Coach (NCR Closed)	Name: <u>Frank Thompson</u> Signature: <u>Frank Thompson</u> Date: <u>11/14/98</u>

000296

1.04 SUBMITTALS

- ORIGINAL**
- A. Submit the following to Fluor Daniel Fernald (FDF) for review with proposal for project:
1. product name;
 2. certification of minimum average roll values (95 percent lower confidence limit); the corresponding test procedures for all geotextile properties listed in Tab 02714P-1 through 02714P-3;
 3. projected geotextile delivery dates; and
 4. recommended long-term storage requirements.
- B. Submit to FDF for review at least 14 calendar days prior to transporting geotextile to site, manufacturing quality control certificates signed by the quality control manager for each roll of geotextile as specified in this Section. The certificates shall state that the geotextiles are continuously inspected and are needle-free. The quality control certificates shall also include:
1. lot, roll numbers, and other identification;
 2. sampling procedures; and
 3. results of quality control tests, including descriptions of test methods used (the Manufacturer quality control tests to be performed are given in this Section).

PART 2 PRODUCTS**2.01 GEOTEXTILE**

- A. Furnish geotextile products that meet the following requirements:
1. minimum average roll values (95 percent lower confidence limit) meeting or exceeding the required property values specified in Tables 02714P-1 (for geotextile filters and sacrificial geotextile filters) and 02714P-2 and 02714P-3 (for geotextile cushions and supplemental geotextile cushions); and
 2. manufactured from first quality polymers, with not more than 20 percent reclaimed polymer used in production.
- B. At least 100,000 ft² of geotextile will be manufactured and supplied specifically for the project from each lot of resin used, unless a smaller quantity is approved by FDF.
- C. Notify FDF at least 14 calendar days in advance of manufacturing geotextile for project with projected production schedule. Allow audit of Manufacturer's quality control procedures and manufacturing process and conformance sampling of geotextile by an FDF



GSE Lining Technology, Inc.

19103 Gundle Road
Houston, Texas 77073
800-435-2008
Fax: 281-230-8663

ORIGINAL

FAX

TO:	Rick Holbrook	FROM:	Eric Reed
COMPANY:	GSE LINING TECHNOLOGY INC.	COMPANY:	
FAX:		FAX:	281-230-8663
# OF PAGES: 2		PHONE:	800-435-2008
DATE: 11/3/98			

Nov 3 6 14 PM '98

For environmental lining solutions...the world comes to GSE.
A GundleST Environmental, Inc. Company

000298

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2064



SYNTHETIC INDUSTRIES

Geosynthetic Products Division

FY90H
FY99-0119 R.O

P 3 of 11
5 of 11
JTY
11-10-98

October 30, 1998

GSE Lining Technology
Eric Reed
19103 Gundle Road
Houston, TX 77073
Ref: Fluor Daniel Fernald Project

ORIGINAL

This is to certify that all Synthetic Industries nonwoven polypropylene geotextiles, shipped to the Fluor Daniel Fernald Ohio Project, will meet Synthetic Industries currently published minimum average roll values. A minimum average roll value is calculated as the mean minus two standard deviations, yielding a 97.5 percent confidence level. These products are tested in accordance with the proper ASTM test methods. This geotextile will be continuously inspected for the presence of needles.

Sincerely

Sid Weiser
Technical Manager PND

FY99-0119 R.O

2064

P. 4 of 96 AN
JTY 11-10-98PHII PROCUREMENT-SPEC-REV 1
Section 02714P: Geotextiles

ORIGINAL

TABLE 02714P-1

REQUIRED PROPERTY VALUES FOR GEOTEXTILE FILTER
861 (8phi) ✓

PROPERTIES	QUALIFIER	UNITS ⁽¹⁾	SPECIFIED ⁽⁴⁾ VALUES	TEST METHOD
<u>Type</u>				
Nonwoven needlepunched				(-)
Polymer composition	minimum	%	95 polypropylene or polyester by weight	(-)
Mass per unit area	minimum	oz/yd ²	7	ASTM D 5261
<u>Filter Requirements</u>				
Apparent opening size (O ₉₅)	maximum	mm	0.180 ✓ 0.212 0.21	Item # 1, Annex # 1 ASTM D 4751
Permittivity	minimum	sec ⁻¹	1.50 0.5	ASTM D 4491
<u>Mechanical Requirements</u>				
Grab strength	minimum	lb	200 180	ASTM D 4632 ⁽¹⁾ ✓
Tear strength	minimum	lb	85 75	ASTM D 4533 ⁽²⁾ ✓
Puncture strength	minimum	lb	130 75	ASTM D 4833 ⁽³⁾ ✓
Burst strength	minimum	psi	400 350	ASTM D 3786 ✓
<u>Durability</u>				
Ultraviolet Resistance	minimum	%	70 70	ASTM D 4355 ✓

Notes:

- (1) Minimum of values measured in machine and cross machine directions with 1 inch clamp on Constant Rate of Extension (CRE) machine.
- (2) Minimum value measured in machine and cross machine direction.
- (3) Tension testing machine with a 1.75-inch diameter ring clamp, the steel ball being replaced with 0.31-inch diameter solid steel cylinder with flat tip centered within the ring clamp.
- (4) All values represent minimum average roll values.
- (5) mm = millimeter
% = percent
oz/yd² = ounce per square yard
sec = second
lb = pound
psi = pound per square inch

000300

ORIGINAL

TABLE 02714P-2

REQUIRED PROPERTY VALUES FOR GEOTEXTILE CUSHION
IN LINER SYSTEM~~102-1671~~ (1061)

PROPERTIES	QUALIFIER	UNITS ⁽¹⁾	SPECIFIED ⁽⁴⁾ VALUES	TEST METHOD
<u>Type</u>				
Nonwoven needlepunched				(-)
Polymer composition	minimum	%	95 polypropylene or polyester by weight	(-)
Mass per unit area	minimum	oz/yd ²	10	ASTM D 5261
<u>Mechanical Requirements</u>				
Grab strength	minimum	lb	250 / 225	ASTM D 4632
Tear strength	minimum	lb	100 / 90	ASTM D 4533 ⁽²⁾ ✓
Puncture strength	minimum	lb	160 / 120	ASTM D 4833 ⁽²⁾ ✓
Burst strength	minimum	psi	510 / 450	ASTM D 3786 ✓
<u>Durability</u>				
Ultraviolet Resistance	minimum	%	70 / 70	ASTM D 4355

Notes:

- (1) Minimum of values measured in machine and cross machine directions with 1 inch clamp on Constant Rate of Extension (CRE) machine.
- (2) Minimum value measured in machine and cross machine direction.
- (3) Tension testing machine with a 1.75-inch diameter ring clamp, the steel ball being replaced with 0.31-inch diameter solid steel cylinder with flat tip centered within the ring clamp.
- (4) All values represent minimum average roll values.
- (5) % = percent
oz/yd² = ounce per square yard
sec = second
lb = pound
psi = pound per square inch

p. 6 of 9
8 of 11

JTT 11-10-98

PHII PROCUREMENT-SPEC-REV 1
Section 02714P: Geotextiles**ORIGINAL**

TABLE 02714P-3

**REQUIRED PROPERTY VALUES FOR SUPPLEMENTAL
GEOTEXTILE CUSHION IN LINER SYSTEM**

1701 (1601)

PROPERTIES	QUALIFIER	UNITS ⁽¹⁾	SPECIFIED ⁽¹⁾ VALUES	TEST METHOD
<u>Type</u>				
Nonwoven needlepunched				(-)
Polymer composition	minimum	%	95 polypropylene or polyester by weight	(-)
Mass per unit area	minimum	oz/yd ²	16	ASTM D 5261
<u>Mechanical Requirements</u>				
Grab strength	minimum	lb	380 / 350	ASTM D 4632 ⁽¹⁾ ✓
Tear strength	minimum	lb	145 / 120	ASTM D 4533 ⁽²⁾ ✓
Puncture strength	minimum	lb	240 / 180	ASTM D 4833 ⁽³⁾ ✓
Burst strength	minimum	psi	800 / 700	ASTM D 3786 ✓
<u>Durability</u>				
Ultraviolet Resistance	minimum	%	70 / 70	ASTM D 4355 ✓

Notes:

- (1) Minimum of values measured in machine and cross machine directions with 1 inch clamp on Constant Rate of Extension (CRE) machine.
- (2) Minimum value measured in machine and cross machine direction.
- (3) Tension testing machine with a 1.75-inch diameter ring clamp, the steel ball being replaced with 0.31-inch diameter solid steel cylinder with flat tip centered within the ring clamp.
- (4) All values represent minimum average roll values.
- (5) % = percent
oz/yd² = ounce per square yard
lb = pound
psi = pound per square inch

[END OF SECTION]

NONWOVEN EOTEXTILES - ENGLISH VALUES

PROPERTY	TEST METHOD	UNITS	VALUE	311	351	401	451	501	601	701	801	1001	1201	1601
MECHANICAL														
Grab Tensile Strength	ASTM D-4632	lbs	TYPICAL	100	105	115	135	155	170	205	230	275	340	425
			MARV	80	90	100	120	135	150	180	200	250	300	380
Grab Elongation	ASTM D-4632	%	TYPICAL	55	56	56	56	56	56	60	60	60	60	65
			MARV	45	50	50	50	50	50	50	50	50	50	50
Tensile Strength	ASTM D-4833	lbs	TYPICAL	65	70	80	90	105	120	135	155	185	220	290
			MARV	50	55	65	70	85	95	110	130	160	180	240
Airtight Burst	ASTM D-3786	psi	TYPICAL	220	240	265	290	325	385	425	475	590	680	950
			MARV	165	185	225	240	275	325	350	400	510	600	800
Trapezoidal Tear	ASTM D-4533	lbs	TYPICAL	40	45	55	60	68	70	88	98	115	130	165
			MARV	30	35	45	50	57	60	75	85	100	115	145
HYDRAULIC														
Apparent Opening Size (AOS)	ASTM D-4751	US Sieve	TYPICAL	100	100	100	100	100	100	100	100	140	140	140
			MARV	70	70	70	70	70	70	70	80	100	100	100
Permittivity	ASTM D-4491	sec ⁻¹	TYPICAL	2.50	2.50	2.50	1.90	1.80	1.70	1.80	1.90	1.60	1.50	1.00
			MARV	2.00	2.00	2.00	1.50	1.40	1.30	1.50	1.50	1.20	1.00	0.70
Permeability	ASTM D-4491	cm/sec	TYPICAL	0.28	0.31	0.34	0.29	0.29	0.32	0.40	0.48	0.40	0.43	0.39
			MARV	0.22	0.25	0.22	0.22	0.23	0.24	0.34	0.38	0.30	0.29	0.27
Water Flow Rate	ASTM D-4491	gpm/ft ²	TYPICAL	130	130	160	140	130	130	130	130	100	90	65
			MARV	110	110	140	120	115	110	110	110	85	75	50
DURANCE														
UV Resistance	ASTM D-4355	% Retained @ 500 hrs	MARV	70	70	70	70	70	70	70	70	70	70	70
STANDARD PACKAGING														
Roll Width	Measured	feet	TYPICAL	12.5/15.0	12.5/15.0	12.5/15.0	12.5/15.0	12.5/15.0	12.5/15.0	12.5/15.0	15.0	15.0	15.0	15.0
Roll Length	Measured	feet	TYPICAL	360	360	360	360	360	300	300	300	300	300	300
Roll Area	Calculated	yd ²	TYPICAL	500/600	500/600	500/600	500/600	500/600	416.67/500	416.67/500	500	500	500	500

NOTES

▲ Values reported in weaker principle direction.

▲ "MARV" indicates minimum average roll value calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any sample taken during quality assurance testing will exceed the value reported.



SYNTHETIC INDUSTRIES

Challanooga, Tennessee

(423) 899-0444 (423) 899-0444 (Fax)

PROPERTY	TEST METHOD	UNITS	VALUE	311	351	401	451	501	601	701	801	1001	1201	1601
MECHANICAL														
Grab Tensile Strength	ASTM D-4632	N	TYPICAL	445	465	510	600	685	755	910	1020	1220	1510	1890
			MARV	355	400	445	530	600	665	800	890	1110	1335	1690
Grab Elongation	ASTM D-4632	%	TYPICAL	55	56	56	56	56	56	60	60	60	60	65
			MARV	45	50	50	50	50	50	50	50	50	50	50
Puncture Strength	ASTM D-4833	N	TYPICAL	285	310	355	400	465	530	600	685	820	975	1290
			MARV	220	240	285	310	375	420	485	575	710	800	1065
Mullen Burst	ASTM D-3786	kPa	TYPICAL	1510	1650	1820	1990	2240	2650	2920	3270	4060	4680	6540
			MARV	1130	1270	1550	1650	1890	2240	2410	2750	3510	4130	5510
Trapezoidal Tear	ASTM D-4533	N	TYPICAL	175	200	240	265	300	310	390	435	510	575	730
			MARV	130	155	200	220	250	265	330	375	445	510	645
HYDRAULIC														
Apparent Opening Size (AOS)	ASTM D-4751	mm	TYPICAL	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.106	0.106	0.106
			MARV	0.212	0.212	0.212	0.212	0.212	0.212	0.212	0.180	0.150	0.150	0.150
Permittivity	ASTM D-4491	sec ⁻¹	TYPICAL	2.50	2.50	2.50	1.90	1.80	1.70	1.80	1.90	1.60	1.50	1.00
			MARV	2.00	2.00	2.00	1.50	1.40	1.30	1.50	1.50	1.20	1.00	0.70
Permeability	ASTM D-4491	cm/sec	TYPICAL	0.28	0.31	0.34	0.29	0.29	0.32	0.40	0.48	0.40	0.43	0.39
			MARV	0.22	0.25	0.22	0.22	0.23	0.24	0.34	0.38	0.30	0.29	0.27
Water Flow Rate	ASTM D-4491	l/min/m ²	TYPICAL	5295	5295	6515	5700	5295	5295	5295	5295	4070	3665	2645
			MARV	4480	4480	5700	4885	4685	4480	4480	4480	3460	3055	2035
ENDURANCE														
UV Resistance	ASTM D-4355	% Retained @ 500 hrs	MARV	70	70	70	70	70	70	70	70	70	70	70
STANDARD PACKAGING														
Roll Width	Measured	meter	TYPICAL	3.81/4.57	3.81/4.57	3.81/4.57	3.81/4.57	3.81/4.57	3.81/4.57	3.81/4.5	4.57	4.57	4.57	4.57
Roll Length	Measured	meter	TYPICAL	109.8	109.8	109.8	109.8	109.8	91.5	91.5	91.5	91.5	91.5	91.5
Roll Area	Calculated	m ²	TYPICAL	418.05/501.66	418.05/501.66	418.05/501.66	418.05/501.66	418.05/501.66	348.37/418.05	348.37/418.05	418.05	418.05	418.05	418.05

NOTES

▲ Values reported in weaker principle direction.

▲ "MARV" indicates minimum average roll value calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any sample taken during quality assurance testing will exceed the value reported.

NONWOVEN GEOTEXTILES - METRIC VALUES

PROPERTY	TEST METHOD	UNITS	VALUE	311	351	401	451	501	601	701	801	1001	1201	1601
MECHANICAL														
Grab Tensile Strength	ASTM D-4632	N	TYPICAL	445	465	510	600	685	755	910	1020	1220	1510	1890
			MARV	355	400	445	530	600	665	800	890	1110	1335	1690
Grab Elongation	ASTM D-4632	%	TYPICAL	55	56	56	56	56	56	60	60	60	60	65
			MARV	45	50	50	50	50	50	50	50	50	50	50
Puncture Strength	ASTM D-4833	N	TYPICAL	285	310	355	400	465	530	600	685	820	975	1290
			MARV	220	240	285	310	375	420	485	575	710	800	1065
Mullen Burst	ASTM D-3786	kPa	TYPICAL	1510	1650	1820	1990	2240	2650	2920	3270	4060	4680	6540
			MARV	1130	1270	1550	1650	1890	2240	2410	2750	3510	4130	5510
Trapezoidal Tear	ASTM D-4533	N	TYPICAL	175	200	240	265	300	310	390	435	510	575	730
			MARV	130	155	200	220	250	265	330	375	445	510	645
HYDRAULIC														
Apparent Opening Size (AOS)	ASTM D-4751	mm	TYPICAL	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.106	0.106	0.106
			MARV	0.212	0.212	0.212	0.212	0.212	0.212	0.212	0.180	0.150	0.150	0.150
Permittivity	ASTM D-4491	sec ⁻¹	TYPICAL	2.50	2.50	2.50	1.90	1.80	1.70	1.80	1.90	1.60	1.50	1.00
			MARV	2.00	2.00	2.00	1.50	1.40	1.30	1.50	1.50	1.20	1.00	0.70
Permeability	ASTM D-4491	cm/sec	TYPICAL	0.28	0.31	0.34	0.29	0.29	0.32	0.40	0.48	0.40	0.43	0.39
			MARV	0.22	0.25	0.22	0.22	0.23	0.24	0.34	0.38	0.30	0.29	0.27
Water Flow Rate	ASTM D-4491	l/min/m ²	TYPICAL	5295	5295	6515	5700	5295	5295	5295	5295	4070	3665	2645
			MARV	4480	4480	5700	4885	4685	4480	4480	4480	3460	3055	2035
ENDURANCE														
UV Resistance	ASTM D-4355	% Retained @ 500 hrs	MARV	70	70	70	70	70	70	70	70	70	70	70
STANDARD PACKAGING														
Roll Width	Measured	meter	TYPICAL	3.81/4.57	3.81/4.57	3.81/4.57	3.81/4.57	3.81/4.57	3.81/4.57	3.81/4.5	4.57	4.57	4.57	4.57
Roll Length	Measured	meter	TYPICAL	109.8	109.8	109.8	109.8	109.8	91.5	91.5	91.5	91.5	91.5	91.5
Roll Area	Calculated	m ²	TYPICAL	418.05/501.66	418.05/501.66	418.05/501.66	418.05/501.66	418.05/501.66	348.37/418.05	348.37/418.05	418.05	418.05	418.05	418.05

NOTES

- ▲ Values reported in weaker principal direction.
- ▲ "MARV" indicates minimum average roll value calculated as typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any sample taken during quality assurance test will exceed the value reported.



SYNTHETIC INDUSTRIES

Chattanooga, Tenn. USA

1/19/99

2064

FERMCO 0U2 FY99-0119 R.O

Synthetic Industries
Individual Roll Data
Bill of Lading: 101

AUG 21 3 55 PM '98

P. 9 of 9
11 of 11
JTT
11-10-98

Roll Number	Style	Batch Number	Mass/ Area	Lab Thick	Tensile (MD)	(XMD)	Elongation (MD)	(XMD)	Trap Tear (MD)	(XMD)	Mullen Burst	Punct. Register	AOS	Perm. sec-1
			Qsy	mils	lbs	lbs	%	%	lbs	lbs	psi	lbs	mm	
			D5261	D5199	D4632	D4632	D4632	D4632	D4633	D4633	D3786	D4633	D4751	D4491
4118650A	1701	40880	17.4	183	467	704	82	72	196	291	970	100		
4118657A	1701	40880	16.6	173	450	705	83	79	202	329	1000	127	0.108	1.584
5137290A	1071	50853	10.8	133	340	393	60	72	154	204	517	132	0.144	2.960
5137300A	1071	50853	11.2	137	337		63		145		521	171	0.145	3.334
5137320A	1071	50853	10.8	130	332	396	65	73	133	176	581	188	0.149	3.652
5137330A	1071	50853	10.9	133	334	403	60	73	137	202	593	182	0.141	3.252
5137340A	1071	50853	10.5	128	336	398	65	74	129	182	554	185		
5137360A	1071	50853	11.3	137	296	417	68	75	124	195	589	183		
5137370A	1071	50853	10.5	126	315	396	67	74	118	177	546	189	0.145	3.690
5137400A	1071	50853	10.9	122	333	423	67	76	122	170		171	0.148	2.540
5137420A	1071	50853	10.5	127	329	378	62	73	152	167	547	189	0.167	3.590
5137430A	1071	50853	10.5	130	327		64		157		559	190		
5137450A	1071	50853	10.4	130	334	385	66	72	162	183	533	178		
5137460A	1071	50853	10.1	125	333	382	69	75	150	206	527	184		
5137470A	1071	50853	10.6	132	336	399	64	71	170	201	549	186	0.139	2.746
5137480A	1071	50853	11.0	134	330	423	68	72	112	173	560	188		
5137490A	1071	50853	11.3	133	315	429	69	73	119	180	580	205		
5137500A	1071	50853	10.4	124	297	380	66	71	117	184	544	181	0.148	2.484
6050309A	861	60217	8.1	112	283	269	56	72	113	130	483	145		
6050381A	861	60217	8.3	112	275	285	61	75	143	156	457	170		
6050400A	861	60217	8.3	113	296	283	58	75	142	159	489	177	0.172	3.293
6050430A	861	60217	8.2	106	277	252	56	72	139	153	444	141	0.177	2.799
6050440A	861	60217	8.1	105	270	253	56	71	106	122	453	147	0.175	3.470
6050460A	861	60217	8.8	117	274	278	58	72	131	141	484	144		
6050470A	861	60217	8.2	107	300	264	60	76	113	125	465	158		
6050490A	861	60217	8.8	112	284	290	59	77	130	139	504	159	0.177	3.250
6050500A	861	60217	8.2	107	282	272	59	78	118	140	456	154	0.174	3.438

Ed Weir

ORIGINAL

Synthetic Industries' current standard manufacturing quality control (MQC) testing frequency for GEOTEX nonwoven geotextiles: (1) test per 90,000 sf (8,360 sm) for index properties (mass per unit area, thickness, grab tensile and elongation, trapezoidal mullen burst and puncture resistance) for styles heavier than 601 and one (1) test per 162,000 sf (15,000 sm) for index properties for styles 601 and lighter. Although we strive to test our nonwoven geotextiles for apparent opening size (AOS) and permeability/permeability/water flow rate approximately once every 340,000 sf (30,160 sm), the actual frequency of testing for these properties will vary depending upon production schedules, product availability, customer requirements, job specifications or other agreements arranged with Synthetic Industries prior to the time of purchase. If additional testing is needed to meet higher frequencies required by the project specifications, it is the purchaser's responsibility to notify Synthetic Industries for assistance in calculating the costs for the additional tests.

These rolls of nonwoven geotextiles are produced, inspected and the test results from the frequency stated above indicates that the rolls produced during the production run meets our published minimum average roll values. approved rolls are shipped for the project until an order requires the material to be shipped. Since rolls are loaded at the warehouse independent of production sequence, the data listed above may include data from rolls which were not shipped. However, the data provided is from the same production run as the rolls actually shipped on this bill of lading.

000306

NONCONFORMANCE REPORT FORM

ORIGINATOR/ASSESSOR	
1	Nonconformance Number/Revision NCR No.: 98-1556 Revision No.
2	Dates Date Discovered: 8/31/98 Date NCR Report Issued: 9/1/98
3	Type of Nonconformance <input checked="" type="checkbox"/> FINDING <input type="checkbox"/> CONCERN
4	Project/Activity @ Fac/Loc/Bldg ON-SITE DISPOSAL FACILITY PH. II/ CELL #2
5	Hazard Category Nuclear: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> Radiological Non-Nuclear: <input type="checkbox"/> High Hazard <input type="checkbox"/> Moderate Hazard <input type="checkbox"/> Low Hazard Industrial: <input type="checkbox"/> Hazardous Waste Activity <input checked="" type="checkbox"/> Standard Industrial Hazard <input type="checkbox"/> FEMP SIH
6	Assessment <input type="checkbox"/> Internal <input type="checkbox"/> External (OEPA, DOE) <input checked="" type="checkbox"/> Supplier/Vendor GEOSYNTEC
7	Assessment Type <input type="checkbox"/> Audit <input checked="" type="checkbox"/> Surveillance <input type="checkbox"/> Inspection <input type="checkbox"/> Other
8	Assessment Number 98-0968
9	Responsible FDF Division/Vendor <input checked="" type="checkbox"/> S&WP <input type="checkbox"/> WMT&SP <input type="checkbox"/> FC&DP <input type="checkbox"/> O&PI <input type="checkbox"/> PS <input type="checkbox"/> SUPPLIER/VENDOR
10	Responsible FDF Department/Vendor CONSTRUCTION/ GEOSYNTEC
11	Responsible Team Leader/Coach/Vendor (Print Name) MIKE HICKEY / BILL ZEBICK / GEOSYN
12	Functional Area (NA for Vendors) (choose any that apply) (Ref. RM-0016) <input checked="" type="checkbox"/> CM <input type="checkbox"/> ED <input type="checkbox"/> RD <input type="checkbox"/> MS <input type="checkbox"/> QA <input type="checkbox"/> AC <input type="checkbox"/> PM <input type="checkbox"/> PI <input type="checkbox"/> FM <input type="checkbox"/> EP <input type="checkbox"/> EW <input type="checkbox"/> MT <input type="checkbox"/> OP <input type="checkbox"/> PT <input type="checkbox"/> SE <input type="checkbox"/> TR <input type="checkbox"/> CT <input type="checkbox"/> HR <input type="checkbox"/> PC <input type="checkbox"/> EM <input type="checkbox"/> FP <input type="checkbox"/> NS <input type="checkbox"/> SH <input type="checkbox"/> RP
13	QA Criteria (choose one that applies Ref. RM-0012) Other Criteria (CONOPS, etc.) (not RM-0012 applicable) <input type="checkbox"/> 1 Program <input type="checkbox"/> 2 Training <input type="checkbox"/> 3 Quality Improv. <input type="checkbox"/> 4 Document/Records <input type="checkbox"/> 5 Work process <input type="checkbox"/> 6 Design <input type="checkbox"/> 7 Procurement <input checked="" type="checkbox"/> 8 Inspect/Test <input type="checkbox"/> 9 Management Assessment <input type="checkbox"/> 10 Independent Assessment <input type="checkbox"/> Other
14	Requirement Description Cite the requirement (clearly, concisely, and completely) and its source, including document identification number, page and paragraph number. A copy of the document (or page of the document) in which the requirement appears may be attached or added to the NCR file. Use additional or separate sheets as necessary. IN ACCORDANCE TO ASTM D 698, SECTION 4.1 STATES A SOIL AT A SELECTED WATER CONTENT IS COMPACTED IN A MOLD TO DETERMINE THE DRY UNIT WEIGHT AND PERCENT MOISTURE CONTENT. THE PROCEDURE IS REPEATED FOR A SUFFICIENT NUMBER OF WATER CONTENTS TO ESTABLISH A RELATIONSHIP BETWEEN THE DRY UNIT WEIGHT AND THE WATER CONTENT OF THE SOIL. THIS DATA WHEN PLOTTED REPRESENTS A CURVILINEAR RELATIONSHIP KNOWN AS THE COMPACTION CURVE. THE VALUES OF OPTIMUM WATER CONTENT AND STANDARD MAXIMUM DRY UNIT WEIGHT ARE DETERMINED FROM THE COMPACTION CURVE.
15	Nonconformance Description Describe the nonconformance. Include details such as supplier names, container numbers, purchase order, work order, or requisition numbers) and clearly describe the deviation from the written requirement. Use additional or separate sheets as necessary. Nonconformance Title or Short Description: WHEN REVIEWING THE PROCTOR CURVE FOR SAMPLE NUMBER LP-II-94 FROM ST. CKPILE 98-9, THE CURVE SHOWED THE OPTIMUM DRY DENSITY AND MOISTURE TO BE 111.4 PCF AND 14.1% UNCORRECTED. THE CURVE WAS FOUND TO BE MISDRAWN WHICH WHEN DRAWN CORRECTLY SHOWED THE OPTIMUM DRY DENSITY AND CORRESPONDING MOISTURE CONTENT TO BE 115.4 PCF AND 14.5% UNCORRECTED. SINCE THESE NEW RESULTS AFFECT THE CORRELATION OF NUCLEAR DENSITY RESULTS, THE DENSITIES AND MOISTURES AS A PERCENTAGE OF CORRESPONDING PROCTORS REQUIRE REVISION. FAILED TESTS AS A RESULT OF APPLYING THE NEW PROCTOR SHALL ALSO BE DISPOSITIONED IN THIS NONCONFORMANCE REPORT.
16	Tagging Required / Number of Tags <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Number of Tags:
17	Originator/Assessor Name: MICHAEL W GODBER Signature: <i>[Signature]</i> Date: 9/2/98
ORIGINATOR/ASSESSOR'S TEAM LEADER'S/COACH'S REVIEW	
18	Originator's/Assessor's Team Leader/Coach Name: FRANK THOMPSON Signature: <i>[Signature]</i> Date: 9/2/98
19	Response Date From Resp. Organ. (Reply within 20 working days)

000307

NONCONFORMANCE REPORT FORM

2064

RESPONSIBLE ORGANIZATION'S CORRECTIVE ACTION RESPONSE

	Nonconformance Number/Revision	NCR No.: <u>EX-98-1556</u>	Revision No. <u>1</u>
20	Root Cause Analysis Provide documentation as attachment. Use additional or separate sheets as necessary	<input type="checkbox"/> YES Level 1 Cat. <input type="checkbox"/> 1H (human per.) <input checked="" type="checkbox"/> 1N (nat. phenom/sabotage) <input type="checkbox"/> NO <input type="checkbox"/> 1E (equip.) <input type="checkbox"/> 1Z (other) TapRoot Cause Code(s) <u>NA</u>	
21	Corrective Action (CA) Description and Disposition Describe the actions necessary to correct the nonconformance. Corrective actions must be detailed and complete. They must be written in a clear, concise, and verifiable manner. The corrective action plan must also include actions to prevent recurrence. Use additional or separate sheets as necessary. (A disposition of Accept-as-is or Repair REQUIRES a written Technical Concurrence/Justification below)	Hardware: <input checked="" type="checkbox"/> Accept-as-is <input type="checkbox"/> Repair <input type="checkbox"/> Rework <input type="checkbox"/> Reject Non-Hardware: <input type="checkbox"/> Other <u>See Attached</u>	
22	Technical Concurrence/Justification (mark NA if not applicable)	Name: <u>JOHN J. BERRETT</u> Signature: <u>[Signature]</u> Date: <u>9-11-98</u>	
23	Was a Design Change Notice Required?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No DCN # _____ Date Issued _____	
24	Was a SBDR Performed? Was a USQD Performed?	<input type="checkbox"/> Yes <input type="checkbox"/> No SBDR # _____ Date Issued _____ <input type="checkbox"/> Yes <input type="checkbox"/> No USQD # _____ Date Issued _____	
25	Actions taken to Prevent Recurrence Use additional or separate sheets as necessary.	<u>Take additional time to complete QC review and internal QA checks before data is used in the field, even if clay material is being used by contractor at his own risk. NA</u>	
26	Proposed Completion Date For CA	Date: <u>9/11/98</u>	
27	Responsible Team Leader/Coach/Vendor	Name: <u>BILL ZEBICK</u> Signature: <u>[Signature]</u> Date: <u>9/11/98</u>	

EVALUATION OF THE CORRECTIVE ACTION RESPONSE BY THE ORIGINATOR/ASSESSOR

28	Response Acceptable?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
29	Originator's/Assessor's	<u>Michael W. Jolley</u>

COMPLETION OF THE CORRECTIVE ACTIONS BY THE RESPONSIBLE ORGANIZATION

30	Date Corrective Action Completed	Date: <u>9/11/98</u>
31	Responsible Team Leader/Coach/Vendor	Name: <u>BILL ZEBICK</u> Signature: <u>[Signature]</u> Date: <u>9/11/98</u>

VERIFICATION OF COMPLETED CORRECTIVE ACTIONS BY THE VERIFIER

32	Verification Action (Describe what objective evidence was examined to verify completion of this action and attach documentation to the NCR)	<u>VERIFIED THE PROCTOR CURVE, WAS AVERAGE DENSITIES, MOISTURES & PERCENT OF PROCTORS WERE CORRECT FOR SP48-9. ALSO VERIFIED THE FAILED AREAS AS A RESULT OF THE CORRECTION WAS RETESTED & PASSED.</u>	
33	Verifier	<u>Michael W. Jolley 9/11/98</u>	
34	Verifier's Team Leader/Coach	<u>FRANK THOMPSON</u> <u>[Signature]</u> <u>9-18-98</u>	

Response to NCR No. FY98-1556 Block 21
(Dated 9/1/98, Page 3 of 5)

Laboratory Sample No. LPII-94 is from Stockpile No. 98-9, which was approximately 3,600 cubic yards in loose stockpile volume. In accordance with Table 6-1 of the Construction Quality Assurance (CQA) Plan [OSDF Document 20100-PL-006, Rev 0, May 1997] requirement of 1 test per 1,500 cubic yards, three samples were obtained from this stockpile for laboratory testing. (The other two samples are Nos. LPII-93 and LPII-97.) The results of the standard Proctor compaction test, per ASTM D 698, were plotted to establish the moisture-density relationship for each soil sample. The results from the three tests, after rock correction, were averaged to obtain a representative stockpile values of maximum dry density (MDD) and corresponding optimum moisture content (OMC). These values were then used to establish an acceptable permeability zone (APZ) for evaluation of field compaction.

The results of the compaction test for sample No. LPII-94 was incorrectly plotted to obtain the required MDD and OMC values for the test sample. When properly plotted, the MDD and OMC values, before rock correction, are approximately 116.0 pcf and 14.0%, respectively. After rock correction, the MDD and OMC values for Sample No. LPII-94 are 116.7 pcf and 13.8% (see attached results). The corrected MDD and OMC values for the other two samples from the same stockpile are: 112.7 pcf and 17.3% (Sample No. LPII-93); and 110.8 pcf and 17.1% (Sample No. LPII-97). By averaging the results of the three tests, the representative stockpile MDD and OMC are 113.4 pcf and 16.1%, respectively. (However, MDD = 111.9 pcf and OMC = 16.1% were initially used for the APZ and evaluation of field compaction. This average MDD value is 1.3% lower than the corrected average MDD of 113.4 pcf.)

Material from this stockpile was used as clay liner by the Contractor from 25 to 31 August 1998. Final results from the stockpile (including off-site laboratory testing) were obtained on 2 September 1998. It should be re-emphasized that the Contractor, based on preliminary laboratory test results from GeoSyntec and with the FDF Construction Manager's approval, elected to use material from this stockpile prior to completion of laboratory conformance testing and approval of the stockpile by GeoSyntec.

OSDF Phase II Technical Specifications Section 02225, Part 2.05 requires the Contractor to identify sources and volumes of clay liner material at least 15 calendar days prior to use to allow for conformance testing of soil by CQC Consultant. Since the beginning of Phase II construction, this specification requirement has never been complied with by the Contractor. GeoSyntec and the Contractor have both written a total of six nonconformance reports (NCRs) on the use of non-approved stockpiled material for clay liner construction. GeoSyntec has repeatedly made efforts to provide some data to the Contractor and FDF so as not to significantly affect the construction schedule. It is evident that this compromise on the part of GeoSyntec has unfortunately affected our ability to have the time necessary to adequately review and QC our test data. However, the data for stockpile No. 98-9 and the related field test data have now been reviewed by GeoSyntec, and in part by FDF, and the following is GeoSyntec's summary.

000309

Response to NCR No. FY98-1556 Block 21 (cont'd)
(Dated 9/1/98, Page 4 of 5)

The effect of using the revised MDD and OMC values of 113.4 pcf and 16.1%, respectively, on the field compacted clay liner material (from 25 to 31 August 1998) has been evaluated by GeoSyntec. The following field tests (see attached test logs, etc.) failed to meet the required minimum percent compaction value (PCV) of 95% and/or field moisture content (FMC) of not more than 3% above OMC (i.e. AOMC):

Test No. (1)	FMC (%) (2)	FDD (pcf) (3)	PCV (%) (4)	AOMC(%) (5)	Results (6)	Retest No. (7)	Results (8)
2-276	19.4	108.4	95.6	+3.3	Fail(AMOC)		NA
2-277	19.5	107.4	94.7	+3.4	Fail	2-333	Fail(AMOC)
2-279	18.9	107.1	94.4	+2.8	Fail	2-284	Pass
2-296	19.5	107.0	94.4	+3.4	Fail	2-335	Fail(AMOC)
2-303	19.5	107.0	94.4	+3.4	Fail	2-334	Pass
2-304	19.9	106.8	94.2	+3.8	Fail	2-336	Pass
2-305	20.4	108.0	95.2	+4.3	Fail(AMOC)		NA
2-306	19.5	107.8	95.1	+3.4	Fail(AMOC)		NA
2-307	20.3	108.0	95.2	+4.2	Fail(AMOC)		NA
2-309	19.9	107.3	94.6	+3.8	Fail	2-337	Pass
2-310	20.5	107.8	95.1	+4.4	Fail(AMOC)		NA

As indicated above, Test nos. 2-277, 2-279, 2-296, 2-303, 2-304, and 2-309 failed to meet the minimum PCV of 95%. Test No. 2-279 was originally declared as a failed test with respect to the APZ, and retested as Test No. 2-284 (see attached test logs). Also, most of the tests exceeded the APZ limit of 3% above the OMC. Test nos. 2-276, 2-306, 2-307, 2-310 and retest nos. 2-333 and 2-335 met the minimum PCV of 95% and were within the APZ, except for the limit of 3% above the OMC. These tests have been recorded as passed on the field density test logs and have been addressed by NCR 20102-007.

All the failed areas with respect to PCV (with the exception of Test No. 2-303) had at least one additional lift of clay placed and compacted when this potential problem was discovered. The areas were retested on 1 September 1998, by excavating to the appropriate lift and performing retests. Passing results were achieved. The results of the retests are summarized above and attached to this NCR. Results have been documented in the field density test logs. Please note that the activity of placement and compaction of additional lift(s) do increase the strength and density of the underlying lift. Therefore, failed results have been remedied and found to comply with the PCV specification requirements.

Response to NCR No. FY98-1556 Block 21 (cont'd)
(Dated 9/1/98, Page 5 of 5)

The issue of FMC exceeding the limit of 3% above OMC has been addressed collectively in NCRs 20102-002, 20102-004 and 20102-007 written by GeoSyntec, and have been supplemented with additional response. For future use a design change notice is being prepared to address the upper moisture limit of 3% above OMC.

Kwasi Badu-Tweneboah, Ph.D., P.E.
Resident Engineer
Ohio Registration No. E-55354



Daniel G. Bodine, P.E.
Managing/Certifying Engineer
Ohio Registration No. E-61363

000311

NONCONFORMANCE REPORT FORM

2064

ORIGINATOR/ASSESSOR

Nonconformance Number/Revision		NCR No.: <u>F498-1324</u>		Revision No.	
Dates		Date Discovered: 7/20/98		Date NCR Report Issued: 7/22/98	
3	Type of Nonconformance	<input checked="" type="checkbox"/> FINDING <input type="checkbox"/> CONCERN			
4	Project/Activity @ Fac/Loc/Bldg	ON-SITE DISPOSAL FACILITY PH. II/ DENSITY TESTS ON CLAY LINER/ OSDF CELL 2			
5	Hazard Category	Nuclear: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> Radiological Non-Nuclear: <input type="checkbox"/> High Hazard <input type="checkbox"/> Moderate Hazard <input type="checkbox"/> Low Hazard Industrial: <input type="checkbox"/> Hazardous Waste Activity <input checked="" type="checkbox"/> Standard Industrial Hazard <input type="checkbox"/> FEMP SIH			
6	Assessment	<input type="checkbox"/> Internal <input type="checkbox"/> External (OEPA, DOE) <input checked="" type="checkbox"/> Supplier/Vendor <u>GEOSYNTEC</u>			
7	Assessment Type	<input type="checkbox"/> Audit <input checked="" type="checkbox"/> Surveillance <input type="checkbox"/> Inspection <input type="checkbox"/> Other			
8	Assessment Number	<u>980800</u>			
9	Responsible FDF Division/Vendor	<input checked="" type="checkbox"/> S&WP <input type="checkbox"/> WMT&SP <input type="checkbox"/> FC&DP <input type="checkbox"/> O&PI <input type="checkbox"/> PS <input type="checkbox"/> SUPPLIER/VENDOR			
10	Responsible FDF Department/Vendor	<u>OSDF/GEOSYNTEC</u>			
11	Responsible Team Leader/Coach/Vendor (Print Name)	<u>BILL ZEBICK/MIKE HICKET/GEOSYNTEC</u>			
12	Functional Area (NA for Vendors) (choose any that apply) (Ref. RM-0016)	<input checked="" type="checkbox"/> CM <input type="checkbox"/> ED <input type="checkbox"/> RD <input type="checkbox"/> MS <input type="checkbox"/> QA <input type="checkbox"/> AC <input type="checkbox"/> PM <input type="checkbox"/> PI <input type="checkbox"/> FM <input type="checkbox"/> EP <input type="checkbox"/> EW <input type="checkbox"/> MT <input type="checkbox"/> OP <input type="checkbox"/> PT <input type="checkbox"/> SE <input type="checkbox"/> TR <input type="checkbox"/> CT <input type="checkbox"/> HR <input type="checkbox"/> PC <input type="checkbox"/> EM <input type="checkbox"/> FP <input type="checkbox"/> NS <input type="checkbox"/> SH <input type="checkbox"/> RP			
13	QA Criteria (choose one that applies Ref. RM-0012) Other Criteria (CONOPS, etc.) (not RM-0012 applicable)	<input type="checkbox"/> 1 Program <input type="checkbox"/> 2 Training <input type="checkbox"/> 3 Quality Improv. <input type="checkbox"/> 4 Document/Records <input type="checkbox"/> 5 Work process <input type="checkbox"/> 6 Design <input type="checkbox"/> 7 Procurement <input checked="" type="checkbox"/> 8 Inspect/Test <input type="checkbox"/> 9 Management Assessment <input type="checkbox"/> 10 Independent Assessment <input type="checkbox"/> Other			
14	Requirement Description <small>Cite the requirement (clearly, concisely, and completely) and its source, including document identification number, page and paragraph number. A copy of the document (or page of the document) in which the requirement appears may be attached or added to the NCR file. Use additional or separate sheets as necessary.</small>	IN ACCORDANCE TO CONTRACT NUMBER FSC 614, SPECIFICATION SECTION 2225, PART 3.03A THE ACCEPTABLE DRY UNIT WEIGHT OF THE COMPACTED CLAY LINER MATERIAL SHALL BE AT LEAST 95% OF STANDARD PROCTOR.			
15	Nonconformance Description <small>Describe the nonconformance. Include details such as supplier names, container numbers, purchase order, work order, or requisition numbers) and clearly describe the deviation from the written requirement. Use additional or separate sheets as necessary.</small>	Nonconformance Title or Short Description: _____ TEST NUMBER 2-9 HAD A CALCULATED DENSITY RESULT OF 94.7 PERCENT. THE CQC CONSULTANT ROUNDED THE VALUE UP TO 95% WHICH THEY RECORDED THE RESULT AS PASSING. SINCE THE CALCULATED RESULT WAS LESS THAN 95%, THE CQC CONSULTANT SHOULD HAVE FAILED THE TEST VALUE.			
16	Tagging Required / Number of Tags	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Number of Tags: _____	
17	Originator/Assessor	Name: MICHAEL W GODBER Signature: <u>Michael W Godber</u> Date: <u>7/23/98</u>			
ORIGINATOR'S/ASSESSOR'S TEAM LEADER'S/COACH'S REVIEW					
Originator's/Assessor's Team Leader/Coach		Name: FRANK THOMPSON Signature: <u>Frank Thompson</u> Date: <u>7-23-98</u>			
19	Response Date From Resp. Organ.	<u>8/12/98</u> (Reply within 20 working days)			

000312

NONCONFORMANCE REPORT FORM

RESPONSIBLE ORGANIZATION'S CORRECTIVE ACTION RESPONSE			
	Nonconformance Number/Revision	MCR No.: <u>F498-1324</u>	Revision No.
20	Root Cause Analysis Provide documentation as attachment. Use additional or separate sheets as necessary.	<input type="checkbox"/> YES Level 1 Cat. <input type="checkbox"/> 1H (human perf.) <input type="checkbox"/> 1N (nat. phenom/sabotage) <input type="checkbox"/> NO <input type="checkbox"/> 1E (equip.) <input type="checkbox"/> 12 (other) TapRoot Cause Code(s) _____	
21	Corrective Action (CA) Description and Disposition Describe the actions necessary to correct the nonconformance. Corrective actions must be detailed and complete. They must be written in a clear, concise, and verifiable manner. The corrective action plan must also include actions to prevent recurrence. Use additional or separate sheets as necessary. (A disposition of Accept-as-is or Repair REQUIRES a written Technical Concurrence/Justification below)	Hardware: <input checked="" type="checkbox"/> Accept-as-is <input type="checkbox"/> Repair <input type="checkbox"/> Rework <input type="checkbox"/> Reject Non-Hardware: <input checked="" type="checkbox"/> Other <p style="text-align: center;">see attached response on page 3 of 3.</p> <p style="text-align: center;"> <i>[Signature]</i> <i>David Batten</i> 7-27-98 7-27-98 </p>	
22	Technical Concurrence/Justification (mark NA if not applicable)	Name: <u>J.C. JENKINS</u> Signature: <u>J.C. Jenkins</u> Date: <u>7/28/98</u>	
23	Was a Design Change Notice Required?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No DCN # _____ Date Issued _____	
24	Was a SBDR Performed? Was a USQD Performed?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No SBDR # _____ Date Issued _____ <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No USQD # _____ Date Issued _____	
25	Actions taken to Prevent Recurrence Use additional or separate sheets as necessary.	SEE ATTACHED LETTER FROM GEDSYNTEC	
26	Proposed Completion Date For CA	Date: <u>NA</u>	
27	Responsible Team Leader/Coach/Vendor	Name: <u>BILL ZEBICK</u> Signature: <u>Bill Zebick</u> Date: <u>7/28/98</u>	
EVALUATION OF THE CORRECTIVE ACTION RESPONSE BY THE ORIGINATOR/ASSESSOR			
28	Response Acceptable?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
29	Originator/Assessor's	<i>Michael W. Miller</i>	
COMPLETION OF THE CORRECTIVE ACTIONS BY THE RESPONSIBLE ORGANIZATION			
30	Date Corrective Action Completed	Date: <u>NA</u>	
31	Responsible Team Leader/Coach/Vendor	Name: <u>BILL ZEBICK</u> Signature: <u>Bill Zebick</u> Date: <u>7/28/98</u>	
VERIFICATION OF COMPLETED CORRECTIVE ACTIONS BY THE VERIFIER			
32	Verification Action (Describe what objective evidence was examined to verify completion of this action or attach documentation to the NCR)	SEE ATTACHED.	
33	Verifier	<i>Michael W. Miller</i>	
CLOSURE BY THE ASSESSOR'S VERIFIER'S TEAM LEADER/COACH			
34	Verifier's Team Leader/Coach	<i>Frank Thompson</i>	<u>8-4-98</u>

000313

Carroll Balino
27 July 98
K. Bachman

NONCONFORMANCE REPORT FORM

ORIGINATOR/ASSESSOR		
1	Nonconformance Number/Revision	NCR No.: <u>F498-1323</u> Revision No.
2	Dates	Date Discovered: <u>7/20/98</u> Date NCR Report Issued: <u>7/22/98</u>
3	Type of Nonconformance	<input checked="" type="checkbox"/> FINDING <input type="checkbox"/> CONCERN
4	Project/Activity @ Fac/Loc/Bldg	ON-SITE DISPOSAL FACILITY PH. III/ DENSITY ON COMPACTED FILL LINER/ OSDF CELL II
5	Hazard Category	Nuclear: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> Radiological Non-Nuclear: <input type="checkbox"/> High Hazard <input type="checkbox"/> Moderate Hazard <input type="checkbox"/> Low Hazard Industrial: <input type="checkbox"/> Hazardous Waste Activity <input checked="" type="checkbox"/> Standard Industrial Hazard <input type="checkbox"/> FEMP SIH
6	Assessment	<input type="checkbox"/> Internal <input type="checkbox"/> External (OEPA, DOE) <input checked="" type="checkbox"/> Supplier/Vendor <u>GEOSYNTEC</u>
7	Assessment Type	<input type="checkbox"/> Audit <input checked="" type="checkbox"/> Surveillance <input type="checkbox"/> Inspection <input type="checkbox"/> Other
8	Assessment Number	<u>98-0799</u>
9	Responsible FDF Division/Vendor	<input checked="" type="checkbox"/> S&WP <input type="checkbox"/> WMT&SP <input type="checkbox"/> FC&DP <input type="checkbox"/> O&M <input type="checkbox"/> PS <input type="checkbox"/> SUPPLIER/VENDOR
10	Responsible FDF Department/Vendor	<u>OSDF/GEOSYNTEC</u>
11	Responsible Team Leader/Coach/Vendor (Print Name)	<u>BILL ZEBACK / MIKE HICKET / GEOSYNTEC</u>
12	Functional Area (NA for Vendors) (choose any that apply) (Ref. RM-0016)	<input checked="" type="checkbox"/> CM <input type="checkbox"/> ED <input type="checkbox"/> RD <input type="checkbox"/> MS <input type="checkbox"/> QA <input type="checkbox"/> AC <input type="checkbox"/> PM <input type="checkbox"/> PI <input type="checkbox"/> FM <input type="checkbox"/> EP <input type="checkbox"/> EW <input type="checkbox"/> MT <input type="checkbox"/> OP <input type="checkbox"/> PT <input type="checkbox"/> SE <input type="checkbox"/> TR <input type="checkbox"/> CT <input type="checkbox"/> HR <input type="checkbox"/> PC <input type="checkbox"/> EM <input type="checkbox"/> FP <input type="checkbox"/> NS <input type="checkbox"/> SH <input type="checkbox"/> RP
13	QA Criteria (choose one that applies Ref. RM-0012) Other Criteria (CONOPS, etc.) (not RM-0012 applicable)	<input type="checkbox"/> 1 Program <input type="checkbox"/> 2 Training <input type="checkbox"/> 3 Quality Improv. <input type="checkbox"/> 4 Document/Records <input type="checkbox"/> 5 Work process <input type="checkbox"/> 6 Design <input type="checkbox"/> 7 Procurement <input checked="" type="checkbox"/> 8 Inspect/Test <input type="checkbox"/> 9 Management Assessment <input type="checkbox"/> 10 Independent Assessment <input type="checkbox"/> Other
14	Requirement Description Cite the requirement (clearly, concisely, and completely) and its source, including document identification number, page and paragraph number. A copy of the document (or page of the document) in which the requirement appears may be attached or added to the NCR file. Use additional or separate sheets as necessary.	IN ACCORDANCE TO CONTRACT NUMBER FSC 614, SPECIFICATION SECTION 2200, PART 3.08C, AND PART 3.08H. THE LOOSE LIFT THICKNESS FOR COMPACTED FILL SHALL BE 8 PLUS OR MINUS 1 INCH. THE MINIMUM DENSITY OF FILL MATERIAL SHALL BE AT LEAST 95% OF PROCTOR.
15	Nonconformance Description Describe the nonconformance. Include details such as supplier names, container numbers, purchase order, work order, or requisition numbers) and clearly describe the deviation from the written requirement. Use additional or separate sheets as necessary.	Nonconformance Title or Short Description: _____ ON THE TEST REPORT DATED JULY 7, 1998 FOR SUBGRADE REPAIR, THE LOOSE LIFT THICKNESS OF REPLACEMENT FILL IS SHOWN TO BE 12-INCHES. ON THE TEST REPORT DATED JULY 6, 1998, FOR SUBGRADE REPAIR THE REPAIRED AREA REQUIRED (3) LIFTS IF COMPACTED CLAY BUT THE DATA SHEET SHOWED THE REPAIR WAS COMPLETED IN (3) LIFTS. TEST NUMBER 444 HAD A CALCULATED DENSITY RESULT OF 94.5%. THE CQC CONSULTANT ROUNDED THE VALUE UP TO 95% WHICH THEY RECORDED THE RESULT AS PASSING. SINCE THE CALCULATED RESULT WAS LESS THAN 95%, THE CQC CONSULTANT SHOULD HAVE FAILED THE TEST. <u>FOR 426</u> <u>ALSO TEST LOCATIONS WERE NOT</u> <u>MA 7/23/98</u>
16	Tagging Required / Number of Tags	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Number of Tags:
17	Originator/Assessor	<u>648/4930</u> Name: MICHAEL W GODBER Signature: <u>Michael W Godber</u> Date: <u>7/23/98</u>
ORIGINATOR'S/ASSESSOR'S TEAM LEADER'S/COACH'S REVIEW		
18	Originator's/Assessor's Team Leader/Coach	Name: FRANK THOMPSON Signature: <u>Frank Thompson</u> Date: <u>7-23-98</u>
19	Response Date From Resp. Organ.	<u>8/12/98</u> (Reply within 20 working days)

000315

RESPONSIBLE ORGANIZATION'S CORRECTIVE ACTION RESPONSE

Nonconformance Number/Revision		NCR No.: <u>F498-1323</u>		Revision No.	
20	Root Cause Analysis Provide documentation as attachment. Use additional or separate sheets as necessary.	<input type="checkbox"/> YES <input type="checkbox"/> NO	Level 1 Cat. <input type="checkbox"/> 1H (human perf.) <input type="checkbox"/> 1E (equip.)	<input type="checkbox"/> 1N (nat. phenom/sabotage) <input type="checkbox"/> 1Z (other)	TapRoot Cause Code(s) _____
21	Corrective Action (CA) Description and Disposition Describe the actions necessary to correct the nonconformance. Corrective actions must be detailed and complete. They must be written in a clear, concise, and verifiable manner. The corrective action plan must also include actions to prevent recurrence. Use additional or separate sheets as necessary. (A disposition of Accept-as-is or Repair REQUIRES a written Technical Concurrence/Justification below)	Hardware: <input checked="" type="checkbox"/> Accept-as-is <input type="checkbox"/> Repair <input type="checkbox"/> Rework <input type="checkbox"/> Reject Non-Hardware: <input type="checkbox"/> Other <p style="font-size: 1.2em;">See response in attached pages 3 and 4 of 4.</p> <p style="font-size: 1.2em;">Daniel Bodine</p> <p style="font-size: 1.2em;">[Signature] 7/27/98</p>			
22	Technical Concurrence/Justification (mark NA if not applicable)	Name: <u>J.C. JENKINS</u> Signature: <u>[Signature]</u> Date: <u>7/28/98</u>			
23	Was a Design Change Notice Required?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	DCN # _____	Date Issued _____	
24	Was a SBDP Performed? Was a USQD Performed?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	SBDP # _____ USQD # _____	Date Issued _____ Date Issued _____	
25	Actions taken to Prevent Recurrence Use additional or separate sheets as necessary.	<p style="font-size: 1.2em;">SEE ATTACHE LETTER FROM GEOSTNTEC</p>			
26	Proposed Completion Date For CA	Date: <u>N/A</u>			
27	Responsible Team Leader/Coach/Vendor	Name: <u>Bill Zebuch</u> Signature: <u>[Signature]</u> Date: <u>7/28/98</u>			

EVALUATION OF THE CORRECTIVE ACTION RESPONSE BY THE ORIGINATOR/ASSESSOR

28	Response Acceptable?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
29	Originator's/Assessor's	<u>[Signature]</u>

COMPLETION OF THE CORRECTIVE ACTIONS BY THE RESPONSIBLE ORGANIZATION

30	Date Corrective Action Completed	Date: _____
31	Responsible Team Leader/Coach/Vendor	Name: <u>BILL ZEBUCH</u> Signature: <u>[Signature]</u> Date: <u>7/28/98</u>

VERIFICATION OF COMPLETED CORRECTIVE ACTIONS BY THE VERIFIER

32	Verification Action (Describe what objective evidence was examined to verify completion of this action and attach documentation to the NCR)	<p style="font-size: 1.2em;">See ATTACHED</p>
33	Verifier	<u>[Signature]</u>

CLOSURE BY THE ASSESSOR'S VERIFIER'S TEAM LEADER/COACH

34	Verifier's Team Leader/Coach	<u>[Signature]</u> 8-4-98
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000316

Response to NCR No. F498-1323 - Block 21
(Dated 7/22/98, Page 3 of 4)

Part 3.07.E. of Section 02200 (Earthwork) requires areas where unsuitable soils are encountered during subgrade preparation to be removed to a minimum depth of 1 foot below the proposed subgrade elevation. The removed material shall be replaced with compacted fill material, placed in loose lifts with a thickness of 8 inches plus or minus 1 inch, and compacted to at least 95 percent standard Proctor maximum dry density per ASTM D 698. The percent compaction of "...at least 95 percent standard Proctor maximum dry density..." is consistent with the requirements of OAC 3745-27-08(C)(1)(d) of the ARAR.

The 12 inches loose lift thickness was shown on the 7 July 1998 test report. All loose lift thicknesses are maximum 8 inches plus or minus 1 inch per Part 3.08.C of Section 02200 or maximum 10 inches if it is the first lift placed on subgrade per Part 3.04.H, Section 02225. The subgrade areas that were repaired on 7 July were small areas where soft or sandy subgrade and/or wells were removed. The actual placement and compaction procedure consisted of the Caterpillar 815B placing and compacting processed clay soil in a continuous operation. The actual "loose" lift thickness was smaller than 12 inches due to this procedure. GeoSyntec's observations of the compaction procedure together with the passing results of the six density tests indicate the fill material be accepted as-is.

On the 6 July 1998 test report, GeoSyntec CQC recorded that two tests were performed at an excavated and repaired subgrade area. The two tests meet the minimum testing frequency requirements for compacted fill (see Table 6-3 of CQA Plan) and each test was conducted using the 8-inch depth probe. The repaired subgrade area was excavated to an approximate depth of 2 to 2.5 ft. for removal of unsuitable soils. The area was filled with processed clay using the Caterpillar 815B and tested as described above. Results of the two tests showed percent compaction values of 98% and 96 %. GeoSyntec believes the fill was well compacted using the Caterpillar 815B and recommends accepting as-is.

It is standard industry practice to report percent compaction value (PCV) to the nearest whole number. Test No. 444 had a field-measured in-situ dry density of 111.4 pcf, with a corresponding laboratory-measured standard Proctor (ASTM D 698) maximum dry density of 117.8 pcf. The calculated PCV is therefore: 94.57% (to 2 decimal places (significant figures)); 94.6% (to 1 decimal place); and 95% (to the nearest whole number). Basic mathematics state that:

- If the decimal number is less than 0.5, round-off to the previous whole number; and
- If it is equal to or greater than 0.5, round-off to the next whole number.


000317

Response to NCR No. F498-1323 - Block 21
(Dated 7/22/98, Page 4 of 4)

Since rounding-off of values to the nearest whole number is generally accepted practice in the industry, GeoSyntec CQC reported the value as 95%, and therefore as a passing test, in accordance with the ARAR requirement of at least 95%. If the calculated value had been 94.4%, the reported percent compaction value would have been 94% and would have been considered as a failing test. The calculated PCV is also based on an average value of three or more standard Proctor compaction tests performed on the clay liner stockpile material, and does not include the standard deviation in the test results as well as inherent variability of the natural clay material.

It should also be noted that GeoSyntec CQC does not only pass or fail compaction based solely on the results of the in-situ tests. CQC also monitors the level or degree of compaction as well as workmanship, and uses common sense and experience in making final decision as to whether a test should be considered pass or fail. GeoSyntec continues to believe that the above rounding-off procedure to report percent compaction is acceptable.

The above rationale was discussed during a 22 July 1998 meeting between GeoSyntec and representatives of FDF's QA, Construction, and Engineering departments. Subsequent to the meeting, GeoSyntec received this non-conformance from FDF. Therefore, as of 27 July 1998, GeoSyntec will report all percent compaction values to one decimal place, and fail all tests below the required value. This will apply to both Cell 1 and Cell 2 construction. For all reported test results prior to 27 July 1998, use as-is.


Daniel Borden 7/27/98



GEOSYNTEC CONSULTANTS

**FLUOR DANIEL
FERNALD**

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04

DESCRIPTION: OSDF Phase II

DATE: 7 day July month 1998 year

SPECIFICATION REQUIREMENTS

SOURCE: Cell #3 Excavation MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY / OTHER: _____ LIFT THICKNESS (LOOSE/COMPACTED): 12"
(CIRCLE ONE)

% COMPACTION: 95% MOISTURE RANGE: ± 3% ASTM D 698: (A) B C / ASTM D 1557: A B C
(CIRCLE ONE)

NUCLEAR GAUGE TYPE: Trox. 3430 NUCLEAR GAUGE SERIAL NO. 27418 COR. FACTOR: Ø QA ID: CS

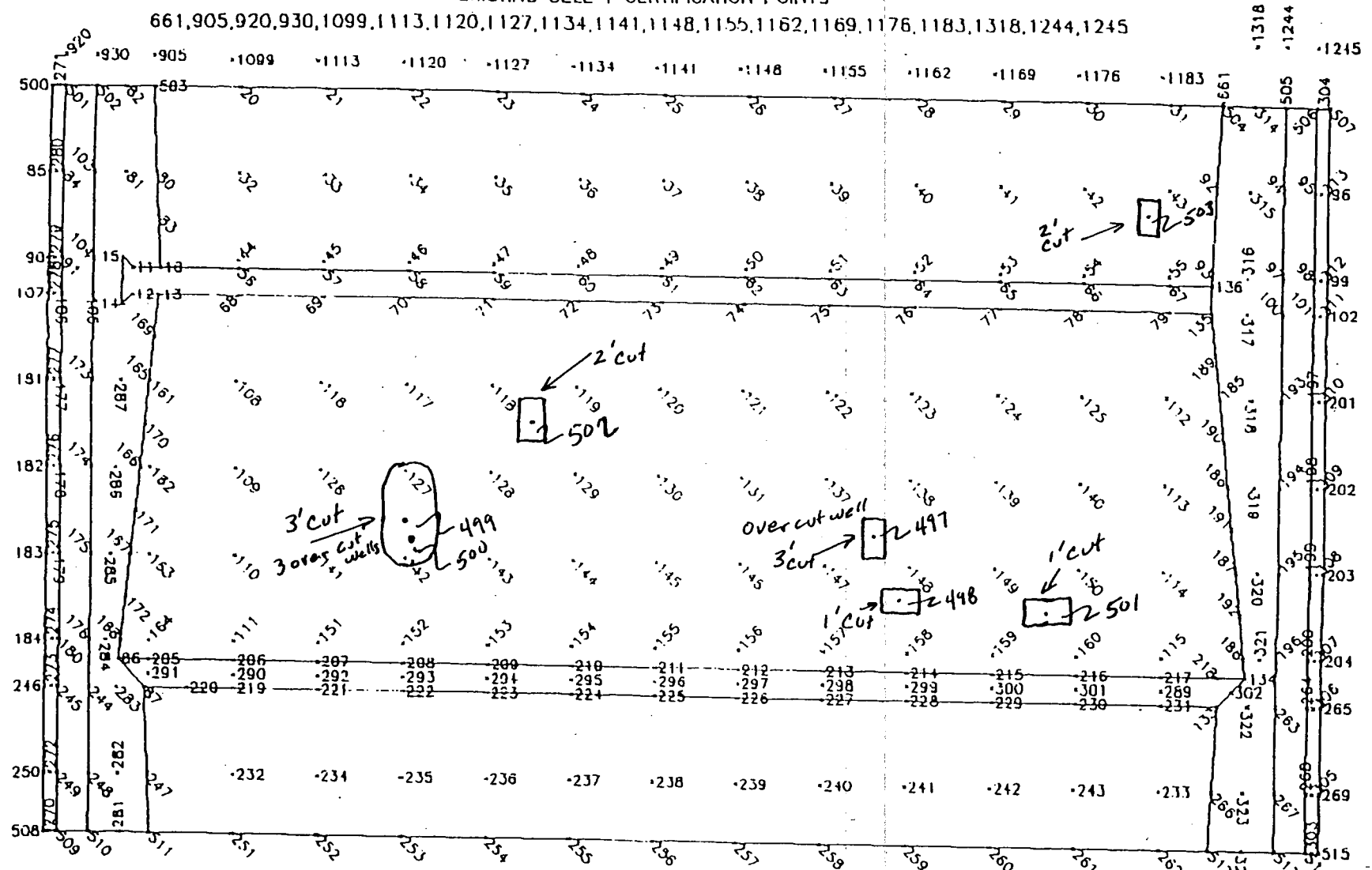
TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS						RETEST NO.	RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL		PASS	FAIL
497	See location Map ↓	8"/3	OSDF 4	14.0	117.8	16.9	131.0	112.1	95 ✓	P				
498		8"/1	↓		↓	16.1	134.4	115.8	98 ✓	P				
499		8"/3	↓		↓	15.5	128.2	111.0	94 ✓		F	500	P	
500		8"/3	↓		↓	16.2	132.7	114.2	97 ✓	P				
501		8"/1	↓		↓	15.3	131.4	114.0	97 ✓	P				
502		8"/2	OSDF 8	11.5	123.0	13.0	134.5	119.0	97 ✓	P				
503		8"/2	OSDF 4	14.0	117.8	16.9	132.3	113.2	96 ✓	P				
50319														

COMMENTS:

7 July 1998 / STRUCTURAL FILL PLACED IN CELL #2 OVER CUTS

SUBGRADE FILE PET2SG.CRD

EXISTING CELL 1 CERTIFICATION POINTS



2064

SHEET 2 of 2

000320



**FLUOR DANIEL
FERNALD** 

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D. 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04

DESCRIPTION: OSDF Phase II

DATE: 6 day July month 1998 year

SPECIFICATION REQUIREMENTS

SOURCE: Cell #3 excavation MATERIAL TYPE: (FILL) / SUBGRADE / SUBBASE / CLAY / OTHER: _____ LIFT THICKNESS (LOOSE/COMPACTED): 8"

% COMPACTION: 95% MOISTURE RANGE: ± 3% ASTM D 698: (CIRCLE ONE) A B C / ASTM D 1557: A B C

NUCLEAR GAUGE TYPE: Troxler 3430 NUCLEAR GAUGE SERIAL NO. 27418 COR. FACTOR: _____ QA ID: CP

[illegible]

COMMENTS:

Date:

$$\frac{YY}{MM} \frac{MM}{PP}$$

Task No.: 04.1



drawing not to scale



GeoSYNTEC CONSULTANTS

FLUOR DANIEL
FERNALD

FIELD NUCLEAR MOISTURE/DENSITY TEST LOG

(ASTM D 3017 AND ASTM D 2922)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ0409 TASK NO.: 04.1

DESCRIPTION: PHASE II CELL 2

DATE: 14 day JULY month 1998 year

SPECIFICATION REQUIREMENTS

SOURCE: STOCKPILE 98-1 MATERIAL TYPE: FILL / SUBGRADE / SUBBASE / CLAY / OTHER: _____ LIFT THICKNESS: (LOOSE) COMPACTED: ±10"
(CIRCLE ONE)

% COMPACTION: > 95% MOISTURE RANGE: 0-+3% omc ASTM D 698: A B C / ASTM D 1557: A B C
(CIRCLE ONE)

NUCLEAR GAUGE TYPE: TROXLER 3430 NUCLEAR GAUGE SERIAL NO. 27418 COR. FACTOR: 2% QA ID: NM

TEST NO.	TEST LOCATION	PROBE DEPTH/ LIFT NO.	LAB RESULTS			FIELD TEST RESULTS							RETEST	
			SAMPLE NO.	OMC (%)	MAX DRY UNIT WT (PCF)	FMC (%)	WET UNIT WT (PCF)	DRY UNIT WT (PCF)	PERCENT COMPACT (%)	PASS	FAIL	RETEST NO.	PASS	FAIL
2-4	SEE ATTACHED DWG	6" - 1	*	13.8	119.3	19.2	116.3	97.5	82		F	2-9	P	
2-5						18.7	131.9	111.1	93		F	2-10	P	
2-6						17.8	132.6	112.6	94		F	2-8	P	
2-7						16.5	133.8	114.8	96	P		2-9	P	
2-8						16.4	132.1	113.5	95	P				
2-9						16.7	131.9	113.0	95	P				
2-10						16.6	132.0	113.2	95	P				

COMMENTS: * AVERAGE VALUES STOCKPILE 98-1

FLOR DANIEL
FERNALD

2064 NONCONFORMANCE REPORT FORM

NOTE: For "OBSERVATIONS", "OBSERVATIONS with CORRECTIVE ACTION RESPONSES", and "PRELIM" see Nonconformance Worksheet. This form may be used as a data input sheet and does not need to be issued as an official QA Record, per QA-0001.

98-493

Assessor	
Nonconformance Number & Revision	FY98-1163REV. 0
Dates	Date Discovered: 5/5/98 Date Report Issued: 5/6/98
Type of Nonconformance	<input type="checkbox"/> Observation <input type="checkbox"/> Observation w/CA Response <input type="checkbox"/> Finding (Processes and Programs) <input checked="" type="checkbox"/> Finding (Hardware/Record Deviation) <input type="checkbox"/> Concern
Facility, Location or Building	ON-SITE DISPOSAL FACILITY
Project/Activity @ Fac/Loc/Bldg	ON-SITE DISPOSAL FACILITY PH. I
Hazard Category	Nuclear: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> Radiological Non-Nuclear: <input type="checkbox"/> High Hazard <input type="checkbox"/> Moderate Hazard <input type="checkbox"/> Low Hazard Industrial: <input type="checkbox"/> Hazardous Waste Activity <input checked="" type="checkbox"/> Standard Industrial Hazard <input type="checkbox"/> FEMP SIH
PAAA PRESCREENING-Did event involve: HazCat 1,2,3 (830.120 QA Requirements) and/or Rad. Fac. & Occup. Rad. Protection?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Assessment Number	97-493
Assessment	<input checked="" type="checkbox"/> Internal <input type="checkbox"/> External (OEPA, DOE) <input type="checkbox"/> Supplier/Vendor
Assessment Type	<input type="checkbox"/> Audit <input checked="" type="checkbox"/> Surveillance <input type="checkbox"/> Inspection <input type="checkbox"/> Other
Responsible Division	<input checked="" type="checkbox"/> S&EP <input type="checkbox"/> WMT&SP <input type="checkbox"/> FC&DP <input type="checkbox"/> O&PI <input type="checkbox"/> PS
Responsible Department	OSDF
Responsible Project/Division Representative	BILL ZEBICK/ MIKE HICKEY
Functional Area (check all that apply)	<input type="checkbox"/> CM <input type="checkbox"/> ED <input type="checkbox"/> RD <input type="checkbox"/> MS <input type="checkbox"/> QA <input type="checkbox"/> AC <input type="checkbox"/> PM <input type="checkbox"/> PI <input type="checkbox"/> FM <input type="checkbox"/> EP <input type="checkbox"/> EW <input type="checkbox"/> MT <input type="checkbox"/> OP <input type="checkbox"/> PT <input type="checkbox"/> SE <input type="checkbox"/> TR <input checked="" type="checkbox"/> CT <input type="checkbox"/> HR <input type="checkbox"/> PC <input type="checkbox"/> EM <input type="checkbox"/> FP <input type="checkbox"/> NS <input type="checkbox"/> SH <input type="checkbox"/> RP
Criteria (choose one that applies)	<input type="checkbox"/> 1 Program <input type="checkbox"/> 2 Training <input type="checkbox"/> 3 Qual Improv <input type="checkbox"/> 4 Doc/Rec <input checked="" type="checkbox"/> 5 Work process <input type="checkbox"/> 6 Design <input type="checkbox"/> 7 Procur <input type="checkbox"/> 8 Inspect/Test <input type="checkbox"/> 9 Mgmt Asmnt <input type="checkbox"/> 10 Indp Asmnt
Requirement (include the Procedure/Specification number, page and/or paragraph number and QUOTE requirement word for word)	<input type="checkbox"/> Attachment CONTRACT NUMBER FSC 597, SPEC SECTION 2605, PART 1.040, STATES PRIOR TO INSTALLATION, SUBMIT DOCUMENTATION OF TRAINING AND CERTIFICATION OF PERSONNEL QUALIFIED FOR PERFORMING HDPE MANHOLE INSTALLATION AND HDPE PIPE JOINING OPERATIONS.
Nonconformance (include details such as supplier name, container numbers, purchase order, work order, or requisition numbers) and clearly describe deviation from the "Requirements"	Nonconformance Title or Short Description: <input type="checkbox"/> Attachment ON 5/5/98 WELDING HAD STARTED ON HDPE PIPE FOR CELL 2, AND THE CERTIFICATIONS FOR THE WELDERS HAD NOT BEEN SUBMITTED AND APPROVED.
Tagging Required / Number of Tags	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Number of Tags:
Prepared by: (print name, signature, phone, mail, and date)	Name: MICHAEL W GODBER Signature: <i>Michael W Godber</i> Phone: 648-3764 Mail Stop: MS-64 Date: 5/6/98
ASSESSOR'S MANAGER'S REVIEW	
Assessor's Manager Prescreen for Potential PAAA (Use Attach. F & G of QA-0001)	HazCat 1, 2, or 3? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Radiological Facility/Occupational Rad Protection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Potential PAAA Applicability <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Assessor's Manager: (print name, signature)	FRANK THOMPSON Name: MICHAEL W GODBER Signature: <i>Frank Thompson</i> Date: 5-13-98
Issued Date From Resp. Organiz.	MAY 21, 1998 MG 913FB

000324

NOTE: For "OBSERVATIONS", "OBSERVATIONS with CORRECTIVE ACTION RESPONSES", and "FINDINGS" that Meritware/Record Development, this form may be used as a data input sheet and does not need to be issued as an official QA Record, per QA-0001.

120FLC
98-493

RESPONSIBLE ORGANIZATION'S CORRECTIVE ACTION RESPONSE	
Root Cause (Concerns only)	<input type="checkbox"/> 1H (human perf.) <input type="checkbox"/> 1N (nat. phenom./sabotage) <input type="checkbox"/> 1E (equip.) <input type="checkbox"/> 1Z (other)
Root Cause Code(s) (from TapRoot)(Concerns)	
Root Cause Analysis Report Number	<input type="checkbox"/> Attachment
Corrective Action (CA) Description and Disposition (A disposition of Accept-as-is or Repair REQUIRES a written Technical Concurrence/Justification below)	<input checked="" type="checkbox"/> Accept-as-is <input type="checkbox"/> Repair <input type="checkbox"/> Rework <input type="checkbox"/> Reject <input type="checkbox"/> Other <p>UPON RECEIPT OF CBWTS + THE APPROVAL OF HYDRO. RESULTS THE PIPING WHICH IS BEING WELDED WILL BE ACCEPTABLE</p> <p>Technical Justification (Accept-as-is or Repair): <input type="checkbox"/> Attachment</p>
Technical Concurrence/Justification (print name, signature, date)	<p>RAH</p> <p>Name: <u>MICHAEL W. GOEBEL</u> Signature: <u>Michael W. Goebel</u> Date: <u>5/7/98</u></p>
Was a Design Change Notice Required?	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No DCN # _____ Date Issued _____</p>
Was a USQD Performed?	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No USQD # _____ Date Issued _____</p>
Actions taken to Prevent Recurrence	<p><input type="checkbox"/> Attachment - CONTRACTORS & SUBMITTAL COORDINATORS WERE COMMUNICATED ON THE IMPORTANCE OF EXPEDITING SUBMITTAL TO ASSURE WORK CAN START EXPEDITIOUSLY</p>
Proposed Completion Date For CA	<p>5/13/98</p>
Responsible Project/Division Representative (print name, signature, and date)	<p>Name: <u>BILL ZERICH</u> Signature: <u>Bill Zerich</u> Date: <u>5/7/98</u></p>
EVALUATION OF THE CORRECTIVE ACTION RESPONSE BY THE ASSESSOR	
Response Acceptable?	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>
Assessor's Printed Name, Signature, Date	<p>Name: <u>MICHAEL W. GOEBEL</u> Signature: <u>Michael W. Goebel</u> Date: <u>5/7/98</u></p>
COMPLETION OF THE CORRECTIVE ACTIONS BY THE RESPONSIBLE ORGANIZATION	
Date Corrective Action Completed	<p>5/13/98</p>
Responsible Project/Division Representative (print name, signature, and date)	<p>Name: <u>BILL ZERICH</u> Signature: <u>Bill Zerich</u> Date: <u>05/13/98</u></p>
VERIFICATION OF COMPLETED CORRECTIVE ACTIONS BY THE ASSESSOR	
Date Verified as Completed	<p>5/13/98</p>
Verification Action (Describe what objective evidence was examined to verify completion of this action)	<p><input checked="" type="checkbox"/> Attachment SEE ATTACHED SUBMITTAL. THE SUBMITTAL FOR THE PEOPLE WELDING THE RPE WAS APPROVED ON THIS DATE.</p>
Verified by (print name, signature, and date)	<p>Name: <u>MICHAEL W. GOEBEL</u> Signature: <u>Michael W. Goebel</u> Date: <u>5/13/98</u></p>
CLOSURE BY THE ASSESSOR'S MANAGER	
Assessor's Manager (print name, signature, and date)	<p>Name: <u>FRANK THOMPSON</u> Signature: <u>Frank Thompson</u> Date: <u>5-13-98</u></p>
Date Report Closed	

000325

Original lost. This copy to serve as original

C O P Y

ORIGINATOR/ASSESSOR	
1	Nonconformance Number/Revision NCR No.: <u>FY 98-1224</u> Revision No.
2	Dates Date Discovered: <u>MAY 28, 1998</u> Date NCR Report Issued: <u>JUNE 2, 1998</u>
3	Type of Nonconformance <input checked="" type="checkbox"/> FINDING <input type="checkbox"/> CONCERN
4	Project/Activity @ Fac/Loc/Bldg <u>HDPE PIPING</u>
5	Hazard Category Nuclear: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> Radiological Non-Nuclear: <input type="checkbox"/> High Hazard <input type="checkbox"/> Moderate Hazard <input type="checkbox"/> Low Hazard Industrial: <input type="checkbox"/> Hazardous Waste Activity <input checked="" type="checkbox"/> Standard Industrial Hazard <input type="checkbox"/> FEMP SIH
6	Assessment <input type="checkbox"/> Internal <input type="checkbox"/> External (OEPA, DOE) <input checked="" type="checkbox"/> Supplier/Vendor (VILLAGE BUILDERS)
7	Assessment Type <input type="checkbox"/> Audit <input checked="" type="checkbox"/> Surveillance <input type="checkbox"/> Inspection <input type="checkbox"/> Other
8	Assessment Number <u>98-0598</u>
9	Responsible FDF Division/Vendor <input checked="" type="checkbox"/> S&WP <input type="checkbox"/> WMT&SP <input type="checkbox"/> FC&DP <input checked="" type="checkbox"/> O&PI <input type="checkbox"/> PS <input type="checkbox"/> SUPPLIER/VENDOR
10	Responsible FDF Department/Vendor <u>CONSTRUCTION/ VILLAGE BUILDERS</u>
11	Responsible Team Leader/Coach/Vendor (Print Name) <u>BILL ZEBICK/ MIKE HICKEY/ VILLAGE BUILDERS</u>
12	Functional Area (NA for Vendors) (choose any that apply) (Ref. RM-0016) <input checked="" type="checkbox"/> CM <input type="checkbox"/> ED <input type="checkbox"/> RD <input type="checkbox"/> MS <input type="checkbox"/> QA <input type="checkbox"/> AC <input type="checkbox"/> PM <input type="checkbox"/> PI <input type="checkbox"/> FM <input type="checkbox"/> EP <input type="checkbox"/> EW <input type="checkbox"/> MT <input type="checkbox"/> OP <input type="checkbox"/> PT <input type="checkbox"/> SE <input type="checkbox"/> TR <input type="checkbox"/> CT <input type="checkbox"/> HR <input type="checkbox"/> PC <input type="checkbox"/> EM <input type="checkbox"/> FP <input type="checkbox"/> NS <input type="checkbox"/> SH <input type="checkbox"/> RP
13	QA Criteria (choose one that applies Ref. RM-0012) Other Criteria (CONOPS, etc.) (not RM-0012 applicable) <input type="checkbox"/> 1 Program <input type="checkbox"/> 2 Training <input type="checkbox"/> 3 Quality Improv. <input type="checkbox"/> 4 Document/Records <input type="checkbox"/> 5 Work process <input type="checkbox"/> 6 Design <input type="checkbox"/> 7 Procurement <input checked="" type="checkbox"/> 8 Inspect/Test <input type="checkbox"/> 9 Management Assessment <input type="checkbox"/> 10 Independent Assessment <input type="checkbox"/> Other
14	Requirement Description Cite the requirement (clearly, concisely, and completely) and its source, including document identification number, page and paragraph number. A copy of the document (or page of the document) in which the requirement appears may be attached or added to the NCR file. Use additional or separate sheets as necessary. IN ACCORDANCE TO CONTRACT NUMBER FSC 589, PART 7, SPEC SECTION 2605, SUBPART 3.04D AND 3.05 A WHICH STATES: HDPE PIPE SHALL BE FREE OF DAMAGE, CRIMPING, AND OTHER DEFECTS. VALIDATED QUALITY RECORD INITIAL <u>DS</u> DATE <u>10-1998</u>
15	Nonconformance Description Describe the nonconformance. Include details such as supplier names, container numbers, purchase order, work order, or requisition numbers) and clearly describe the deviation from the written requirement. Use additional or separate sheets as necessary. Nonconformance Title or Short Description: THE STUBOUTS FOR LDS AND LCS REDUNDANT PIPING FOR CELL 2 ARE OUT OF ROUND (OVAL SHAPED). WITH THE PIPE IN THIS CRIMPED CONDITION IT CAN NOT BE FITTED WITH A COUPLING. <u>LDS & LCS REDUNDANT</u>
16	Tagging Required / Number of Tags <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Number of Tags: <u>1/1</u>
17	Originator/Assessor Name: <u>MICHAEL W GODBER</u> Signature: <u>Michael W Godber</u> Date: <u>6/4/98</u>
ORIGINATOR'S/ASSESSOR'S TEAM LEADER'S/COACH'S REVIEW	
18	Originator's/Assessor's Team Leader/Coach ame: <u>FRANK THOMPSON</u> Signature: <u>Frank Thompson</u> Date: <u>6/4/98</u>

000326

NONCONFORMANCE REPORT FORM

19	Response Date From Resp. Organ.	JUNE 22, 1998		(Reply within 20 working days)
RESPONSIBLE ORGANIZATION'S CORRECTIVE ACTION RESPONSE				
	Nonconformance Number/Revision	NCR No.:	Revision No.	
20	Root Cause Analysis Provide documentation as attachment. Use additional or separate sheets as necessary	<input type="checkbox"/> YES Level 1 Cat. <input type="checkbox"/> 1H (human perf.) <input type="checkbox"/> 1N (nat. phenom/sabotage) <input checked="" type="checkbox"/> NO <input type="checkbox"/> 1E (equip.) <input type="checkbox"/> 1Z (other) TapRoot Cause Code(s) _____		
21	Corrective Action (CA) Description and Disposition Describe the actions necessary to correct the nonconformance. Corrective actions must be detailed and complete. They must be written in a clear, concise, and verifiable manner. The corrective action plan must also include actions to prevent recurrence. Use additional or separate sheets as necessary. (A disposition of Accept-as-is or Repair REQUIRES a written Technical Concurrence/Justification below)	Hardware: <input type="checkbox"/> Accept-as-is <input type="checkbox"/> Repair <input checked="" type="checkbox"/> Rework <input type="checkbox"/> Reject Non-Hardware: <input type="checkbox"/> Other Re-form 6" pipe using heat gun, pipe clamps or mandrel as required, restore to round shape and fuse coupling (s) per manufacturer's specifications. Leak test after coupling p.p.c in accordance with Specification 2010-0005 and per No. 1700-004. Name: Richard McGuire Signature: Richard McGuire Date: 6/17/98		
22	Technical Concurrence/Justification (mark NA if not applicable)	Name: Richard McGuire Signature: Richard McGuire Date: 6/17/98		
23	Was a Design Change Notice Required?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No DCN # _____ Date Issued _____		
24	Was a SBDR Performed? Was a USQD Performed?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No SBDR # _____ Date Issued _____ <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No USQD # _____ Date Issued _____		
25	Actions taken to Prevent Recurrence Use additional or separate sheets as necessary.	FOR FUTURE CLEANOUTS (DUAL CONTAINED) QIA WILL INSPECT THEM AT THE SUPPLIER FACILITY PRIOR TO DELIVERY		
26	Proposed Completion Date For CA	Date: 7/1/98		
27	Responsible Team Leader/Coach/Vendor	Name: Richard McGuire Signature: Richard McGuire Date: 6/17/98 Name: MICHAEL W. GIBSON Signature: Michael W. Gibson Date: 6/17/98		
EVALUATION OF THE CORRECTIVE ACTION RESPONSE BY THE ORIGINATOR/ASSESSOR				
28	Response Acceptable?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
29	Originator's/Assessor's	Name: MICHAEL W. GIBSON Signature: Michael W. Gibson Date: 6/17/98		
COMPLETION OF THE CORRECTIVE ACTIONS BY THE RESPONSIBLE ORGANIZATION				
30	Date Corrective Action Completed	Date: 9/22/98		
31	Responsible Team Leader/Coach/Vendor	Name: Louis R. WEHLITZ Signature: Louis R. Wehlitz Date: 10/9/98		
VERIFICATION OF COMPLETED CORRECTIVE ACTIONS BY THE VERIFIER				
32	Verification Action (Describe what objective evidence was examined to verify completion of this action and attach documentation to the NCR)	FROM REVIEW OF TEST RESULTS CONDUCTED ON THE LEACHATE PIPING, THEY WERE FOUND TO PASS THE SPECIFIED REQUIREMENTS WITH NO LEAKS. SEE ATTACHED TEST REPORTS.		
33	Verifier	Name: MICHAEL W. GIBSON Signature: Michael W. Gibson Date: 10/9/98		
CLOSURE BY THE ASSESSOR'S VERIFIER'S TEAM LEADER/COACH				

34 VERIFIER'S TEAM
LEADER/COACH

FRANK THOMPSON Frank Thompson 10-9-98
000327

FDF SURVEILLANCE REPORT

SURVEILLANCE NO.:

98-0598

START DATE:

6/2/98

FINISH DATE:

9/30/98

SURVEILLANCE TITLE/DESCRIPTION: INSPECTION OF LCS, LDS, AND LCS REDUNDANT PIPING FOR CELL 2
REFERENCE SPEC SECTION 2605

Surveilled DIV./DEPT./PROJ./SUPPLIER: DIVISION: SOILS AND WATER
DEPARTMENT: ON-SITE DISPOSAL FACILITY
SUBCONTRACT NUMBER: FSC 589
FILE NUMBER 8.6

LOCATION/FACILITY: ONSITE DISPOSAL FACILITY, CELL 2

ASSESSED ACTIVITY: HDPE PIPE INSPECTION

Page 1 of 1

DISTRIBUTION:

D.J. CROSBY MS-30
MIKE GODBER MS-64
JAY JALOVEC MS-45
ECDC MS-52-7
DIANA SPARKS MS-90
FRANK THOMPSON MS-52-2

ORIGINAL

SUMMARY:

ON JUNE 2, 1998 THE STUBOUTS FOR THE LCS, LCS REDUNDANT, AND LDS PIPING AT THE CLEANOUTS WERE INSPECTED FOR DEFECTS. FROM REVIEW OF THE PIPING ASSOCIATED WITH THE CLEANOUTS, THE 6-INCH LDS AND 6-INCH LCS REDUNDANT PIPING WERE FOUND TO BE OUT OF ROUND. THIS OUT OF ROUND CONDITION IS A VIOLATION OF SPEC. SECTION 2605 WHICH STATES HDPE PIPE SHALL BE FREE OF DAMAGE, CRIMPING AND OTHER DEFECTS. TO STATUS THIS NONCONFORMING CONDITION, NCR NUMBER 98-1224 WAS WRITTEN. THE PIPING HAS SINCE BEEN REPAIRED BY THE SUPPLIER TECHNICIAN, AND NCR 98-1224 WAS CLOSED WHEN THE PIPE WAS TESTED IN ACCORDANCE TO DCN 20102-010 AND PASSED.

SEE ATTACHED
SURVEILLANCE CHECKLIST
NCR 98-1224
SURVEILLANCE FOR PIPE TESTS

Surveillance Status: ☒ Closed ☐ Open (needs follow-up documentation for closure)

NONCONFORMANCE TYPES AND NUMBERS ISSUED: NONE

MA 9/30/98 SEE NCR: 98-1224

ASSESSOR NAME(S) PRINTED MICHAEL W GODBER

SIGNATURE(S)

Michael W Godber

DATE:

9/30/98

ASSESSOR'S ORGANIZATION

Quality Assurance

ASSESSOR'S TEAM COACH NAME PRINTED

SIGNATURE

FRANK THOMPSON

Frank Thompson

DATE:

10-9-98

F-4949-RV1 (02/02/98)

FDF SURVEILLANCE CHECKLIST

SURVEILLANCE NO.:

980598

START DATE:

6/2/98

ASSESSOR:

MICHAEL W. GODBET

SURVEILLANCE TITLE/DESCRIPTION:

Surveilled DIV./DEPT./PROJECT:

DIVISION: SOILS AND WATER

DEPARTMENT: ON-SITE DISPOSAL FACILITY

PROJECT: LEACHATE CONVEYANCE SYSTEM

SUBCONTRACT NUMBER: FSC 589

FILE NUMBER 8.6

Page ___ of ___

Item	Requirements / Results	Sat (✓)	Unsat (✓)
	<p>LOCATION OF SURVEILLANCE: CELL 2, STUBOUTS FOR THE LCS, LDS, LCS REDUNDANT PIPING. PIPING IS PART OF THE CLEANOUTS PLACED BY VILLAGE BUILDERS</p>		
1.	<p><u>Requirements:</u> SPEC SECTION 2605, PART 3.04D AND 3.04A</p> <p>VERIFY THE HDPE PIPE IS FREE OF DAMAGE, CRIMPING AND OTHER DEFECTS.</p> <p style="text-align: center; font-size: 2em; font-weight: bold;">ORIGINAL</p> <p><u>Results:</u> (6") CLEAN STUBOUTS FOR LDS & LCS REDUNDANT 6 INCH PIPE WERE OUT OF ROUND. SEE ATTACHED NCTR 98-1224. NCTR 98-1224 WAS CLOSED AFTER THE PIPE WAS TESTED + PASSED.</p>	<p>X 9/22/98</p>	<p>6/2/98 X</p>
	<p><u>Requirements:</u></p> <p><u>Results:</u></p>		

CERTIFICATE OF ACCURACY

CUSTOMER:

PETRO ENVIRONMENTAL TECHNOLOGIES INC.
7851 PALACE DRIVE
CINCINNATI, OHIO 45247

SALES ORDER NO.

J 003287

STANDARDS TRACEABLE TO N.I.S.T.

INSTRUMENT CERTIFIED

DESCRIPTION DIGITAL MAN
MANUFACTURER MERIAM
MODEL NO. DP2000I
RANGE 0-75 PSI
ACCURACY .1%
SERIAL NUMBER D1205E15
DATE CERTIFIED 02-20-98
N.I.S.T. NO. 822/MET57

MINOR DIV. .2 PSI
AMBIENT TEMP. 75 F.
BAROMETRIC PRESS. 30.16 IN. HG.
RELATIVE HUMIDITY 54 %

PRESSURE GAUGE
ASHCROFT
45 1279 AS 04 L
0-30 PSI
.5 % FULL SCALE
N/A
08-04-98
98-2678

VALUED APPLIED	INDICATED	DEVIATION
PSI	PSIG	
0	0	NO READABLE ERROR
3	3	NO READABLE ERROR
6	6	NO READABLE ERROR
9	9	NO READABLE ERROR
12	12	NO READABLE ERROR
15	15	NO READABLE ERROR
18	18	NO READABLE ERROR
21	21	NO READABLE ERROR
24	24	NO READABLE ERROR
27	27	NO READABLE ERROR
30	30	NO READABLE ERROR

USING STANDARDS TRACEABLE TO THE N.I.S.T., THIS INSTRUMENT IS CERTIFIED
 TO BE ACCURATE WITHIN A MAXIMUM ERROR OF: $\pm .5\%$

☒ SPAN☐ READING

WE FURTHER CERTIFY THAT OUR CALIBRATION SYSTEM COMPLIES WITH MIL STD. 45662-A.

CERTIFIED BY

R. G.
 TECHNICIAN

DATE

AUGUST 4, 1998

000330

981097

ORIGINAL

HDPE PIPING
PRESSURE TEST RECORD

TEST RECORD NO.: PET-004

DATE: September 16, 1998

LINE SERVICE NO.: LCS 6-in. Carrier Line	LINE MEDIUM: HDPE 6-in. dia. Carrier Pipe		
MAX. OPERATING PRESSURE: Gravity	TEST PRESSURE: 15.0 PSI		
SPECIFICATION CODE: Tech. Spec. Section 02605	TEST MEDIUM: Air		
REFERENCE DRAWINGS/TEST BOUNDARIES:			
Air pressure tested the LCS Pipe at the West Berm in OSDF Cell 2 from the Liner Penetration Box to Manhole No. 2.			
HDPE PIPE INSTALLED: Yes - that portion welded into the liner penetration box.			
BACKFILL CONDITIONS: Compacted Clay			
ALL REQUIRED GAUGES INSTALLED/ISOLATED: Yes CONFIRMATION: Yes DATE: 09/15/98			
CQC NOTIFIED: Yes — GeoSyntec	DATE/TIME: 09/16/98 — 4:00 PM		
TEST GAUGE IDENT.: Certification Number: 98-2678	CALIBRATION DUE DATE: 08/04/99		
TEST START TIME: 4:10 PM	TEST GAUGE READING: 15.2 PSI		
TEST FINISH TIME: 5:10 PM	TEST GAUGE READING: 15.2 PSI		
TEST VERIFICATION	ACCEPT REJECT DATE		
CONTRACTOR: <i>J. Richard Schairbaum</i>	X		09/16/98
CQC CONSULT.: <i>Callie Schairbaum</i>	X		09/16/98
FDF QA/QC: <i>Michael J. Miller</i>	X		09/16/98
REMARKS/COMMENTS:			
None.			
REVIEWED/TESTED BY: <i>J. Richard Schairbaum</i>		DATE: 09/18/98	
J. Richard Schairbaum, Quality Assurance Manager			

000331

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UNFLOON DANIEL FERNALD

2064

CONTRACTOR: PETRO

OTHER: ☐

TEST LOCATION: Coll. 2, LCS 6" line, between LCS tank and penetration box

SITE CQA MANAGER day/mo/yr

SHEET NO. _____ OF _____

PRESSURE TEST LOG

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO: G00409 TASK NO.: 04

DESCRIPTION: Phase II

YEAR: 1998

CONTRACTOR: PETRO

TEST DESCRIPTION: Air Pressure Test, 15 psi for one hour

MATERIAL DESCRIPTION:

FORCEMAIN: ☐

CONTAINMENT: ☒

MANHOLE: ☐

OTHER: ☐

TEST LOCATION: 10" LCS between Manhole #2 and penetration box

READING NO.	DATE (day/mo)	TIME	READING	CHANGE IN READING	QA ID
1	16 Sept.	1317	✓ 15.2	0	CS
2	↓	1332	15.2	0	CS
3	↓	1347	15.2	0	CS
4	↓	1402	15.2	0	CS
5	↓	1417	✓ 15.4	0	CS

VISUAL MONITORING:

J. Richard Delaney 9/17/98
CONTRACTOR'S REPRESENTATIVE day/mo/yr

Calvin S. Lewis H6 Sep
SITE COA MANAGER day/mo/yr

FINAL
APPROVAL:

J. P. Schmitt
CONTRACTOR'S REPRESENTATIVE day/mo/yr

SITE CQA MANAGER day/mo

COPY TO:

981097

ORIGINAL

HDPE PIPING
PRESSURE TEST RECORD

2064

TEST RECORD NO.: PET-009

DATE: September 18, 1998

LINE SERVICE NO.: LDS 6-in. Carrier Line	LINE MEDIUM: HDPE 6-in. dia. Carrier Pipe		
MAX. OPERATING PRESSURE: Gravity	TEST PRESSURE: 15.0 PSI		
SPECIFICATION CODE: Tech. Spec. Section 02605	TEST MEDIUM: Air		
REFERENCE DRAWINGS/TEST BOUNDARIES:			
Air pressure tested the LDS Pipe at the West Berm in OSDF Cell 2 from the Liner Penetration Box to Manhole No. 2.			
HDPE PIPE INSTALLED: Yes - that portion welded into the liner penetration box.			
BACKFILL CONDITIONS: Compacted Clay			
ALL REQUIRED GAUGES INSTALLED/ISOLATED: Yes CONFIRMATION: Yes DATE: 09/15/98			
CQC NOTIFIED: Yes -- GeoSyntec	DATE/TIME: 09/18/98 -- 1:00 PM		
TEST GAUGE IDENT.: Certification Number: 98-2678	CALIBRATION DUE DATE: 08/04/99		
TEST START TIME: 1:15 PM	TEST GAUGE READING: 15.2 PSI		
TEST FINISH TIME: 2:15 PM	TEST GAUGE READING: 15.2 PSI		
TEST VERIFICATION	ACCEPT REJECT DATE		
CONTRACTOR: <i>J. Richard Schairbaum</i>	X		09/18/98
CQC CONSULT.: <i>Colin How</i>	X		09/18/98
FDF QA/QC: <i>Mark W. Jones</i>	X		09/18/98
REMARKS/COMMENTS:			
None.			
REVIEWED/TESTED BY: <i>J. Richard Schairbaum</i>		DATE: 09/18/98	
J. Richard Schairbaum, Quality Assurance Manager			

000334

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PRESSURE TEST LOG

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO: GQ0409 TASK NO.: 04

DESCRIPTION: Phase II

YEAR: 1998

CONTRACTOR: PETRO

TEST DESCRIPTION: One hour, air pressure test. Minimum 15psi for one hour with 0psi loss.

MATERIAL DESCRIPTION: FORCEMAIN: ☒ CONTAINMENT: ☐ MANHOLE: ☐ OTHER: ☐
6" LDS gravity force main.

TEST LOCATION: From the LDS markhole #2 to the Cell #2 penetration boxes

READING NO.	DATE (day/mo)	TIME	READING	CHANGE IN READING	QA ID
1	18 Sept 98	1315	15.2 psi	0	C1
2		1330	15.2	0	C1
3		1345	15.2	0	C1
4		1415 1400	15.2	0	C1
5		1415	15.2	0	C1

**VISUAL
MONITORING:**

J. R. Schaubert 9/22/98
CONTRACTOR'S REPRESENTATIVE day/mo/yr

Callie F. Baker 22 Sep
SITE CQA MANAGER day/mo/yr

FINAL
APPROVAL:

J. R. Scherbaum 9/22/98
CONTRACTOR'S REPRESENTATIVE day/mo/yr

Callist. Linton 22 Sep 14
SITE COA MANAGER day/mo

COPY TO: PETRO

981097

HDPE PIPE
PRESSURE TEST RECORD

ORIGINAL

2064

TEST RECORD NO.: PET-001

DATE: September 15, 1998

LINE SERVICE NO.: LDS 10-in. Sec. Containment		LINE MEDIUM: HDPE 10-in. dia. Containment Pipe	
MAX. OPERATING PRESSURE: Gravity		TEST PRESSURE: 15.0 PSI	
SPECIFICATION CODE: Tech. Spec. Section 02605		TEST MEDIUM: Air	
REFERENCE DRAWINGS/TEST BOUNDARIES: Air pressure tested LDS Pipe at the West Berm in Cell 3 from the Liner Penetration Box to Manhole No. 2 within OSDF Cell 2.			
HDPE PIPE INSTALLED: Yes - that portion welded into the liner penetration box.			
BACKFILL CONDITIONS: Compacted clay			
ALL REQUIRED GAUGES INSTALLED/ISOLATED: Yes CONFIRMATION: Yes DATE: 09/15/98			
CQC NOTIFIED: Yes — GeoSyntec		DATE/TIME: 09/15/98 — 3:30 PM	
TEST GAUGE IDENT.: Certification Number: 98-2678		CALIBRATION DUE DATE: 08/04/98	
TEST START TIME: 3:45 PM		TEST GAUGE READING: 15.1 PSI	
TEST FINISH TIME: 4:45 PM		TEST GAUGE READING: 15.1 PSI	
TEST VERIFICATION		ACCEPT	REJECT
CONTRACTOR: J. Richard Schairbaum		X	9/15/98
CQC CONSULT.: K. L. H. H. H.		X	9/15/98
FDF QA/QC: M. J. J. J.		X	9/15/98
REMARKS/COMMENTS: None.			
REVIEWED/TESTED BY: J. Richard Schairbaum		DATE: 09/18/98	
J. Richard Schairbaum, Quality Assurance Manager			

000336

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PRESSURE TEST LOG

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO: GQ0409 TASK NO.: 04

DESCRIPTION: PHASE II CONSTRUCTION

YEAR: 1998

CONTRACTOR: PETRO ENVIRONMENTAL

TEST DESCRIPTION: AIR PRESSURE TEST ON 10" LDS PIPE FOR CELL-2 / 15psi minimum for 1 hr
0 psi loss

MATERIAL DESCRIPTION:

FORCEMAIN: ☐

CONTAINMENT: ☒

MANHOLE: ☐

OTHER: ☐

TEST LOCATION: CELL-2 10" LPS PIPE from penetration box to Manhole #2

[illegible]

**VISUAL
MONITORING:**

J. Richard Schuler 9/18/98
CONTRACTOR'S REPRESENTATIVE day/mo/yr

18 SEPT. 1998
SITE COA MANAGER day/mo/yr
Representative

**FINAL
APPROVAL:**

J. R. F. Smith 9/10/98
CONTRACTOR'S REPRESENTATIVE Day/mo/yr

Colin P. Lukens 18 Sept 1998
SITE CQA MANAGER day/mo/yr

COPY TO: FILE

HDPE PIPE
PRESSURE TEST RECORD

ORIGINAL

2064

TEST RECORD NO.: PET-005

DATE: September 16, 1998

LINE SERVICE NO.: Red. LCS 6-in. Carrier Line	LINE MEDIUM: HDPE 6-in. dia. Carrier Pipe		
MAX. OPERATING PRESSURE: Gravity	TEST PRESSURE: 15.0 PSI		
SPECIFICATION CODE: Tech. Spec. Section 02605	TEST MEDIUM: Air		
REFERENCE DRAWINGS/TEST BOUNDARIES:			
Air pressure tested the Red. LCS Pipe at the West Berm in OSDF Cell 2 from the Liner Penetration Box to Manhole No. 2.			
HDPE PIPE INSTALLED: Yes - that portion welded into the liner penetration box.			
BACKFILL CONDITIONS: Compacted Clay			
ALL REQUIRED GAUGES INSTALLED/ISOLATED: Yes CONFIRMATION: Yes DATE: 09/15/98			
CQC NOTIFIED: Yes — GeoSyntec	DATE/TIME: 09/16/98 — 5:00 PM		
TEST GAUGE IDENT.: Certification Number: 98-2678	CALIBRATION DUE DATE: 08/04/99		
TEST START TIME: 5:35 PM	TEST GAUGE READING: 15.2 PSI		
TEST FINISH TIME: 6:40 PM	TEST GAUGE READING: 15.2 PSI		
TEST VERIFICATION	ACCEPT	REJECT	DATE
CONTRACTOR: <i>J. Richard Schairbaum</i>	X		09/16/98
CQC CONSULT: <i>Colin J. Schairbaum</i>	X		09/16/98
FDF QA/QC: <i>Michael J. Polley</i>	X		09/16/98
REMARKS/COMMENTS:			
None.			
REVIEWED/TESTED BY: <i>J. Richard Schairbaum</i>		DATE: 09/18/98	
J. Richard Schairbaum, Quality Assurance Manager			

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000338

PRESSURE TEST LOG

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO: GQ0409 TASK NO.: 04.1

DESCRIPTION: Phase II

YEAR: 1998

CONTRACTOR: PETRO

TEST DESCRIPTION: Air Pressure Test, 15 PSI minimum, 1 hour w/no loss

MATERIAL DESCRIPTION:

FORCE MAIN: ☒

CONTAINMENT: ☐

MANHOLE: ☐

OTHER: ☐

TEST LOCATION: Cell 2, LCS Redundant 6" line between LCS tank and penetration box

[illegible]

VISUAL MONITORING:

J. Richard Schainbaum 9/13/98
CONTRACTOR'S REPRESENTATIVE day/mo/yr

Rob Peddicord
SITE COA MANAGER
RESPONSIBLE

16/4/98
day/mo/yr

FINAL
APPROVAL


CONTRACTOR'S REPRESENTATIVE day/mo/yr

SITE COA MANAGER day/mo

COPY TO:

981097

HDPE PIPE
PRESSURE TEST RECORD

ORIGINAL

2064

TEST RECORD NO.: PET-002

DATE: September 16, 1998

LINE SERVICE NO.: Red. LCS 10-in. Sec. Containment		LINE MEDIUM: HDPE 10-in. dia. Containment Pipe	
MAX. OPERATING PRESSURE: Gravity		TEST PRESSURE: 15.0 PSI	
SPECIFICATION CODE: Tech. Spec. Section 02605		TEST MEDIUM: Air	
REFERENCE DRAWINGS/TEST BOUNDARIES:			
Air pressure tested Redundant LCS Pipe at the West Berm in Cell 2 from the Liner Penetration Box to Manhole No. 2.			
HDPE PIPE INSTALLED: Yes - that portion welded into the liner penetration box.			
BACKFILL CONDITIONS: Compacted clay			
ALL REQUIRED GAUGES INSTALLED/ISOLATED: Yes CONFIRMATION: Yes DATE: 09/15/98			
CQC NOTIFIED: Yes — GeoSyntec		DATE/TIME: 09/16/98 — 10:00 AM	
TEST GAUGE IDENT.: Certification Number: 98-2678		CALIBRATION DUE DATE: 08/04/99	
TEST START TIME: 10:15 AM		TEST GAUGE READING: 15.3 PSI	
TEST FINISH TIME: 11:30 AM		TEST GAUGE READING: 15.3 PSI	
TEST VERIFICATION		ACCEPT	REJECT
CONTRACTOR: <i>J. Richard Schairbaum</i>		X	9/16/98
CQC CONSULT: <i>Calvin J. Schairbaum</i>		X	9/16/98
FDF QA/QC: <i>Michael J. Schairbaum</i>		X	9/16/98
REMARKS/COMMENTS:			
None.			
REVIEWED/TESTED BY: <i>J. Richard Schairbaum</i>		DATE: 09/18/98	
J. Richard Schairbaum, Quality Assurance Manager			

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000340

PRESSURE TEST LOG

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO: GQ0409 TASK NO.: 04

DESCRIPTION: Phase II

YEAR: 1998

CONTRACTOR: PETRO

TEST DESCRIPTION: Air pressure test, 15 ~~min~~ psi for one hour

MATERIAL DESCRIPTION:

FORCEMAIN: ☐

CONTAINMENT: ☒

MANHOLE: ☐OTHER: ☐

TEST LOCATION: 10" LCS Redundant between Markide #2 and penetration
line

READING NO.	DATE (day/mo)	TIME	READING	CHANGE IN READING	QA ID
Initial	16 Sept.	1015	15.3	0	CS
1	↓	1030	15.3	0	CS
2		1045	15.3	0	CS
3		1100	15.3	0	CS
4		1115	15.3	0	CS
5		1130	15.3	0	CS

VISUAL

MONITORING:

J. Richard Delaney 9/17/98
CONTRACTOR'S REPRESENTATIVE day/mo/yr

day / mo / yr

Collins, P. 16 Sept
SITE COA MANAGER day/mo/yr

SITE COA ~~MANAGER~~

day/mo/yr

FINAL

APPROVAL:


CONTRACTOR'S REPRESENTATIVE day/mo/yr

day/mo/yr

SITE CQA MANAGER

day/mo

COPY TO:

Author: Mike Godber at FNST-04

Date: 10/9/98 1:09 PM

Priority: Normal

Diana Sparks at FNUN-01

Frank Thompson, Mike Godber

Subject: 98-00598 surv. CLOSURE

2064

DEAR DIANA

FOR THE RECORD NCR 98-1224 WAS OFFICIALLY CLOSED ON THIS DATE WHICH
ALSO CLOSED SURVEILLANCE NUMBER 98-0598.

THANKS

MIKE

000342

NONCONFORMANCE REPORT FORM

ORIGINATOR/ASSESSOR			
1	Nonconformance Number/Revision	NCR No.: <u>FY98-1306</u>	Revision No. <u>0</u>
2	Dates	Date Discovered: <u>7/14/98</u>	Date NCR Report Issued: <u>7/15/98</u>
3	Type of Nonconformance	<input checked="" type="checkbox"/> FINDING <input type="checkbox"/> CONCERN	
4	Project/Activity @ Fac/Loc/Bldg	ON-SITE DISPOSAL FACILITY PH. II	
5	Hazard Category	Nuclear: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> Radiological Non-Nuclear: <input type="checkbox"/> High Hazard <input type="checkbox"/> Moderate Hazard <input type="checkbox"/> Low Hazard Industrial: <input type="checkbox"/> Hazardous Waste Activity <input checked="" type="checkbox"/> Standard Industrial Hazard <input type="checkbox"/> FEMP SIH	
6	Assessment	<input type="checkbox"/> Internal <input type="checkbox"/> External (OEPA, DOE) <input checked="" type="checkbox"/> Supplier/Vendor <u>GEOSYNTEC</u>	
7	Assessment Type	<input type="checkbox"/> Audit <input checked="" type="checkbox"/> Surveillance <input type="checkbox"/> Inspection <input type="checkbox"/> Other	
8	Assessment Number	98-0773, 98-0772	
9	Responsible FDF Division/Vendor	<input checked="" type="checkbox"/> S&WP <input type="checkbox"/> WMT&SP <input type="checkbox"/> FC&DP <input type="checkbox"/> O&PI <input type="checkbox"/> PS <input type="checkbox"/> SUPPLIER/VENDOR	
10	Responsible FDF Department/Vendor	CONSTRUCTION/ GEOSYNTEC	
11	Responsible Team Leader/Coach/Vendor (Print Name)	MIKE HICKEY/ BILL ZEBICK/ DAN BODINE	
12	Functional Area (NA for Vendors) (choose any that apply) (Ref. RM-0016)	<input checked="" type="checkbox"/> CM <input type="checkbox"/> ED <input type="checkbox"/> RD <input type="checkbox"/> MS <input type="checkbox"/> QA <input type="checkbox"/> AC <input type="checkbox"/> PM <input type="checkbox"/> PI <input type="checkbox"/> FM <input type="checkbox"/> EP <input type="checkbox"/> EW <input type="checkbox"/> MT <input type="checkbox"/> OP <input type="checkbox"/> PT <input type="checkbox"/> SE <input type="checkbox"/> TR <input type="checkbox"/> CT <input type="checkbox"/> HR <input type="checkbox"/> PC <input type="checkbox"/> EM <input type="checkbox"/> FP <input type="checkbox"/> NS <input type="checkbox"/> SH <input type="checkbox"/> RP	
13	QA Criteria (choose one that applies Ref. RM-0012) Other Criteria (CONOPS, etc.) (not RM-0012 applicable)	<input type="checkbox"/> 1 Program <input type="checkbox"/> 2 Training <input type="checkbox"/> 3 Quality Improv. <input type="checkbox"/> 4 Document/Records <input type="checkbox"/> 5 Work process <input type="checkbox"/> 6 Design <input type="checkbox"/> 7 Procurement <input checked="" type="checkbox"/> 8 Inspect/Test <input type="checkbox"/> 9 Management Assessment <input type="checkbox"/> 10 Independent Assessment <input type="checkbox"/> Other	
14	Requirement Description <small>Cite the requirement (clearly, concisely, and completely) and its source, including document identification number, page and paragraph number. A copy of the document (or page of the document) in which the requirement appears may be attached or added to the NCR file. Use additional or separate sheets as necessary.</small>	IN ACCORDANCE TO CONTRACT # 614, SPECIFICATION SECTION 2225, (COMPACTED CLAY LINER AND CAP), PART 2.01D, THE CLAY LINER MATERIAL SHALL BE TESTED FOR PERMEABILITY AND ALSO TESTED TO ASSURE THE PARTICLE SIZE OF THE MATERIAL IS BY WEIGHT GREATER THAN 15% PASSING THE .002 MM SIEVE.	
15	Nonconformance Description <small>Describe the nonconformance. Include details such as supplier names, container numbers, purchase order, work order, or requisition numbers) and clearly describe the deviation from the written requirement. Use additional or separate sheets as necessary.</small>	Nonconformance Title or Short Description: _____ THE PERMEABILITY AND HYDROMETER TEST RESULTS HAVE NOT BEEN SUBMITTED ON THE CLAY LINER MATERIAL FROM STOCKPILE 1. SO THEREFORE THE MATERIAL CAN NOT BE PLACED IN THE CELL TILL THE RESULTS ON THE MATERIAL ARE ACCEPTED BY ENGINEERING. ON 6/14/98 CLAY LINER WAS PLACED AND COMPACTED IN CELL III AND THE PERMEABILITIES AND HYDROMETER RESULTS HAVE NOT BEEN SUBMITTED BY THE VENDOR YET. SEE ATTACHED SKETCH OF THE LOCATION OF UNSATISFACTORY CLAY MATERIAL <div style="text-align: center; font-size: 2em; font-weight: bold;">ORIGINAL</div>	
16	Tagging Required / Number of Tags	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Number of Tags: <u>N/A</u>	
17	Originator/Assessor	Name: MIKE GODBER Signature: <u>[Signature]</u> Date: <u>7/15/98</u>	
ORIGINATOR'S/ASSESSOR'S TEAM LEADER'S/COACH'S REVIEW			
18	Originator's/Assessor's Team Leader/Coach	Name: FRANK THOMPSON Signature: <u>[Signature]</u> Date: <u>7-15-98</u>	

NONCONFORMANCE REPORT FORM

2064

RESPONSIBLE ORGANIZATION'S CORRECTIVE ACTION RESPONSE		
Nonconformance Number/Revision		NCR No.: <u>FY98-1306</u> Revision No.
20	Root Cause Analysis Provide documentation as attachment. Use additional or separate sheets as necessary.	<input type="checkbox"/> YES Level 1 Cat. <input type="checkbox"/> 1H (human perf.) <input type="checkbox"/> 1N (nat. phenom/sabotage) <input type="checkbox"/> NO <input type="checkbox"/> 1E (equip.) <input type="checkbox"/> 1Z (other) Tap Root Cause Code(s) _____
21	Corrective Action (CA) Description and Disposition Describe the actions necessary to correct the nonconformance. Corrective actions must be detailed and complete. They must be written in a clear, concise, and verifiable manner. The corrective action plan must also include actions to prevent recurrence. Use additional or separate sheets as necessary. (A disposition of Accept-as-is or Repair REQUIRES a written Technical Concurrence/Justification below)	Hardware: <input checked="" type="checkbox"/> Accept-as-is <input type="checkbox"/> Repair <input type="checkbox"/> Rework <input type="checkbox"/> Reject Non-Hardware: <input type="checkbox"/> Other STOCK PILE WILL BE APPROVED WHEN THE HYDROMETER + THE REST OF PERMEABILITY TESTS ARE COMPLETE + THE PASS. <h2 style="text-align: center;">ORIGINAL</h2>
22	Technical Concurrence/Justification (mark NA if not applicable)	Name: <u>BILL ZEBICK</u> Signature: <u>Bill Zebick</u> Date: <u>7/16/98</u>
23	Was a Design Change Notice Required?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No DCN # _____ Date Issued _____
24	Was a SBDR Performed? Was a USQD Performed?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No SBDR # _____ Date Issued _____ <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No USQD # _____ Date Issued _____
25	Actions taken to Prevent Recurrence Use additional or separate sheets as necessary.	GEOSYNTEC WILL HAVE ALL GEOTECHNICAL DATA APPROVED FOR EACH STOCKPILE PRIOR TO ALLOWING THE CONTRACTOR ACCESS TO THE MATERIAL. GEOSYNTEC HIRED (2) ADDITIONAL TECHS TO HANDLE THE WORK LOAD. Date: <u>7/22/98</u>
26	Proposed Completion Date For CA	Date: <u>7/22/98</u>
27	Responsible Team Leader/Coach/Vendor	Name: <u>BILL ZEBICK</u> Signature: <u>Bill Zebick</u> Date: <u>7/22/98</u>
EVALUATION OF THE CORRECTIVE ACTION RESPONSE BY THE ORIGINATOR/ASSESSOR		
28	Response Acceptable?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
29	Originator's/Assessor's	<u>Michael W. Goff</u>
COMPLETION OF THE CORRECTIVE ACTIONS BY THE RESPONSIBLE ORGANIZATION		
30	Date Corrective Action Completed	Date: <u>7/22/98</u>
31	Responsible Team Leader/Coach/Vendor	Name: <u>MICHAEL W. GOFF</u> Signature: <u>Michael W. Goff</u> Date: <u>7/22/98</u>
VERIFICATION OF COMPLETED CORRECTIVE ACTIONS BY THE VERIFIER		
32	Verification Action (Describe what objective evidence was examined to verify completion of this action and attach documentation to the NCR)	FOR STOCKPILE 98-1, THE HYDROMETERS + PERMEABILITIES WERE SUBMITTED + MET THE ACCEPTANCE CRITERIA REFERENCED IN SPEC SECTION 2225 (CLAY LINER). SEE ALSO HYDROMETERS + PERMS FOR 1-28-2, 3, 4, 5.
33	Verifier	<u>Michael W. Goff</u>
CLOSURE BY THE ASSESSOR'S/VERIFIER'S TEAM LEADER/COACH		
34	Verifier's Team Leader/Coach	<u>Jacob Thompson</u> <u>7-22-98</u>

Petro Environmental Technologies

**Petro Environmental Technologies
Nonconformance Reports**

NCR Number	Date	Originator	Location	Feature of Work	Description of Problem	Acknowledgement of Nonconformance
001	30-Jul-98	Dave Williams	Cell 2	Clay Placement	Petro did not identify sources and quant. of clay liner material at least 15 days prior to use to permit conformance of the material by the CQC Consultant.	Dave Williams - Petro Env. Tech. Bill Zebick - Fluor Daniel R. Schairbaum - Petro Env. Tech. Dan Bodine - GeoSyntec
002	4-Aug-98	Dave Williams	Cell 2	Clay Placement	Petro did not identify sources and quant. of clay liner material at least 15 days prior to use, to permit conformance of the material by the CQC Consultant.	Dave Williams - Petro Env. Tech. Bill Zebick - Fluor Daniel R. Schairbaum - Petro Env. Tech. Dan Bodine - GeoSyntec
003	4-Aug-98	Dave Williams	SP-5	Silt fence installation around the former stockpile	The silt fence installed around SP-5 was not installed per these standards or in accordance with Petro Environmental's submittal.	Dave Williams - Petro Env. Tech. Lee McDaniel - Fluor Daniel R. Schairbaum - Petro Env. Tech. Mary Eleton - Fluor Daniel
004	13-Aug-98	Dave Williams	SWU	Area Access	Petro Environmental's Field Superintendent's (Don Beedle) Annual Site Worker Training expired on 23 July 98, and was still working within the SWU.	Dave Williams - Petro Env. Tech. Lee McDaniel - Fluor Daniel R. Schairbaum - Petro Env. Tech. Mary Eleton - Fluor Daniel
005	18-Aug-98	Dave Williams	Cell 1	Placement of Imp. Materials	Petro placed 18 loads of Cat 1 and Cat 2 materials without spreading and smooth drum rolling at the end of the work day.	Dave Williams - Petro Env. Tech. Bill Zebick - Fluor Daniel R. Schairbaum - Petro Env. Tech. Dan Bodine - GeoSyntec
006	19-Aug-98	Dave Williams	Borrow Area	Identifying clay stockpiles for CQC conformance tstng./ clay placement	Petro Env. Tech. is currently placing clay from a stockpile where conformance testing has not been completed.	Dave Williams - Petro Env. Tech. Bill Zebick - Fluor Daniel R. Schairbaum - Petro Env. Tech. Dan Bodine - GeoSyntec

**Petro Environmental Technologies
Nonconformance Reports**

NCR Number	Date	Originator	Location	Feature of Work	Description of Problem	Acknowledgement of Nonconformance
007	26-Aug-98	Dave Williams	SWU	Construction of Interceptor Ditch #1	Earth staples that were used to tie-into the previously constructed HDPE lined ditch at D1/9, penetrated into and through the HDPE liner.	Dave Williams - Petro Env. Tech. Lee McDaniel - Fluor Daniel R. Schairbaum - Petro Env. Tech. Reinhard Friske - Fluor Daniel
008	4-Sep-98	Dave Williams	SWU	Excavation of "soft spot" adjacent to haul rd.	Excavation of a soft area to replace with compactable material exceeded the 3 ±1 foot requirement as specified in 3.2.D of Tech. Spec. Section 02205.	Dave Williams - Petro Env. Tech. Lee McDaniel - Fluor Daniel R. Schairbaum - Petro Env. Tech. Mary Eleton - Fluor Daniel
009	17-Sep-98	Mark Micochero	Cell 2	Installation of geosynthetics (secondary)	Solmax deployed geomembrane liner material across the toe of the East Slope and ended the work day without seaming this panel.	Marc Micochero - Solmax Dave Williams - Petro Env. Tech. Mike Godber - Fluor Daniel R. Schairbaum - Petro Env. Tech. Bill Zebick - Fluor Daniel Dan Bodine - GeoSyntec
010	21-Sep-98	Mark Micochero	Cell 2	Installation of geosynthetics (secondary)	Visqueen was not covering one roll of GCL material adjacent to the East Drainage Swale east of Cell 2 to protect from precipitation events.	Marc Micochero - Solmax Dave Williams - Petro Env. Tech. Mike Godber - Fluor Daniel R. Schairbaum - Petro Env. Tech. Bill Zebick - Fluor Daniel Dan Bodine - GeoSyntec
011	21-Sep-98	Mark Micochero	Cell 2	Installation of geosynthetics (secondary)	Some temporary patches across the cell floor were not completely seamed as required.	Marc Micochero - Solmax Mike Godber - Fluor Daniel R. Schairbaum - Fluor Daniel Bill Zebick - Fluor Daniel Dan Bodine - GeoSyntec

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SWU EXCAVATION/OSDF (PHASE II) PROJECT
Subcontract No. FSC 614; Project Nos. 20102/20402
Petro Environmental Technologies, Inc.

2064

NONCONFORMANCE REPORT FORM
NOTICE OF NONCONFORMANCE

To: (Contractor/Subcontractor)

Nonconformance Notice No.: 001

Dave Williams, General Superintendent

Date: July 30, 1998

Petro Environmental Technologies, Inc.

Time: 7:00 a.m.

CONTRACTOR: Your attention is directed to the following occurrence of nonconformance:

Location & Feature of Work: Cell 2 - Identifying clay stockpiles for CQC Conformance Testing/Clay Placement

Description of Problem (Include contract specification/plan/drawing or FDF reference):

Per paragraph 3.06.A of Technical Specification Section 02225, Petro Environmental must identify sources and quantities of clay liner material at least 15 days prior to use to permit conformance of the material by the CQC Consultant. Additionally, Petro Environmental is currently placing clay from a stockpile where conformance testing has not yet been completed.

Probable Cause of Problem:

Petro Environmental is not producing sufficient quantities of clay sources to meet the clay placement demand, therefore, cannot identify and provide stockpile sources to permit conformance testing by the CQC Consultant a minimum of 15 days prior to anticipated use.

How and When Problem Was Located (Include estimate of how long the problem has existed):

Petro Environmental started placing clay from Stockpile #3 on 7/29/98 at approximately 3:00 p.m. The decision to place clay from this stockpile at Petro Environmental's own risk was made by the General Superintendent.

Suggested Corrective Action:

Petro Environmental needs to increase its clay production to meet the clay placement demands in Cell 2 and to provide sufficient testing time for the CQC Consultant.

Suggested Method to Prevent Future Similar Problems:

Petro Environmental needs to operate 2 soil screeners on a full-time basis to increase daily production quantities.

Contractor Action Taken:

Petro Environmental is currently placing clay from Stockpile #3 at their own risk, and are making provisions to operate soil screeners full time to increase daily clay production quantities.

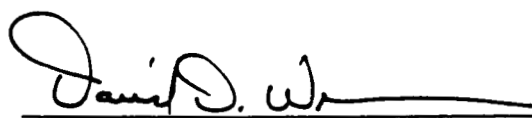
000348

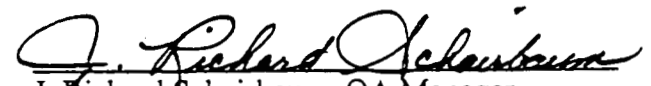
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CQC Rep Comments:


Two soil screeners on a 8-10 hour basis (full time)
may not be sufficient to catch up.
QWB

Receipt Acknowledged: Date: July 30, 1998 Time: 08:20


Dave Williams, General Superintendent
Petro Environmental Technologies, Inc.


J. Richard Schairbaum, QA Manager
Petro Environmental Technologies, Inc.


Construction Manager
Fluor Daniel Fernald


CQC Consultant Field Monitor
GeoSyntec, Inc.

000349

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SWU EXCAVATION/OSDF (PHASE II) PROJECT
Subcontract No. FSC 614; Project Nos. 20102/20402
Petro Environmental Technologies, Inc.

2064

NONCONFORMANCE REPORT FORM
NOTICE OF NONCONFORMANCE

To: (Contractor/Subcontractor)

Nonconformance Notice No.: 002

Dave Williams, General Superintendent

Date: August 4, 1998

Petro Environmental Technologies, Inc.

Time: 3:00 p.m.

CONTRACTOR: Your attention is directed to the following occurrence of nonconformance:

Location & Feature of Work: Cell 2 - Identifying clay stockpiles for CQC Conformance Testing/Clay Placement

Description of Problem (Include contract specification/plan/drawing or FDF reference):

Per paragraph 3.06.A of Technical Specification Section 02225, Petro Environmental must identify sources and quantities of clay liner material at least 15 days prior to use to permit conformance of the material by the CQC Consultant. Additionally, Petro Environmental is currently placing clay from a stockpile where conformance testing has not yet been completed.

Probable Cause of Problem:

Petro Environmental is not producing sufficient quantities of clay sources to meet the clay placement demand, therefore, cannot identify and provide stockpile sources to permit conformance testing by the CQC Consultant a minimum of 15 days prior to anticipated use.

How and When Problem Was Located (Include estimate of how long the problem has existed):

Petro Environmental started placing clay from Stockpile #4 on 8/3/98. The decision to place clay from this stockpile at Petro Environmental's own risk was made by the General Superintendent.

Suggested Corrective Action:

Petro Environmental needs to increase its clay production to meet the clay placement demands in Cell 2 and to provide sufficient testing time for the CQC Consultant.

Suggested Method to Prevent Future Similar Problems:

Petro Environmental needs to operate 2 soil screeners on a full-time basis to increase daily production quantities. A third soil screener may need to be made operational, as well as possibly operating 6 or 7 days per week.

Contractor Action Taken:

Petro Environmental is currently placing clay from Stockpile #4 at their own risk, and are making provisions to operate all on-site soil screeners (3) full time to increase daily clay production quantities.

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Receipt Acknowledged:

Date: 8/4/98


Time: 17:25



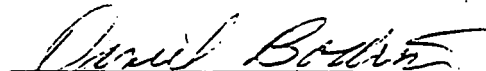
Dave Williams, General Superintendent
Petro Environmental Technologies, Inc.



J. Richard Schairbaum, QA Manager
Petro Environmental Technologies, Inc.



Construction Manager
Fluor Daniel Fernald



CQC Consultant Field Monitor
GeoSyntec, Inc.

000351

SWU EXCAVATION/OSDF (PHASE II) PROJECT
Subcontract No. FSC 614; Project Nos. 20102/20402
Petro Environmental Technologies, Inc.

#5
2064

NONCONFORMANCE REPORT FORM
NOTICE OF NONCONFORMANCE

To: (Contractor/Subcontractor)

Nonconformance Notice No.: 005

Dave Williams, General Superintendent

Date: August 18, 1998

Petro Environmental Technologies, Inc.

Time: 7:30 a.m.

CONTRACTOR: Your attention is directed to the following occurrence of nonconformance:

Location & Feature of Work: OSDF Cell 1 - Placement of impacted materials

Description of Problem (Include contract specification/plan/drawing or FDF reference):

Paragraph 6.9 of the Impacted Material Placement Plan requires that at the end of each working day, exposed impacted material surfaces shall be spread and smooth drum rolled to seal the surface to protect against excessive infiltration and to control fugitive dust emissions. Additionally, paragraph 8.3.1 of the Impacted Material Placement Plan requires that after spreading and initial compaction of Category 2 materials, Category 1 material shall be spread over the Category 2 material, spread and compacted.

At the end of the work day on August 17, 1998, Petro Environmental placed 18 loads of Category 1 and 2 loads of Category 2 materials without spreading and smooth drum rolling at the end of the work day. These materials were left in stockpiles and the Category 2 material was not subsequently covered with Category 1 material as required.

Probable Cause of Problem:

Petro Environmental's overloaded the capabilities of the OSDF Cell's resources for this day and hauled beyond the normal ending time, thereby preventing cell personnel from being able to comply with IMPP requirements.

How and When Problem Was Located (Include estimate of how long the problem has existed):

FDF's Kevin Harbin informed Petro Environmental of the developing problem at the end of the work day.

Suggested Corrective Action:

All of the Category 1 and 2 material stockpiles must be spread and compacted prior to beginning placement activities on August 18, 1998.

Suggested Method to Prevent Future Similar Problems:

Petro Environmental needs to improve communication between the SWU and the OSDF Cell 1 in order to ensure that the cell's resources are not overloaded, thereby preventing cell personnel from being able to spread, compact and smooth drum roll materials placed at the end of each work day. The Cell 1 Area Manager needs to communicate with the SWU Area Manager and cease daily hauling operations to permit sufficient time near the end of the work day to properly handle the previously impacted materials in conformance with the IMPP.

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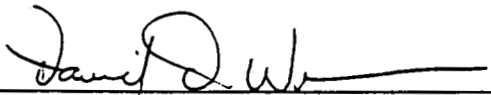
#5


Contractor Action Taken:


Petro Environmental will properly address the stockpiles placed on August 17, 1998 prior to initiating placement activities on August 18, 1998.

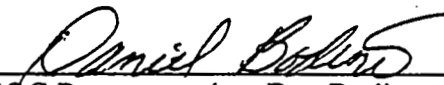
FDF Representative's Comments:

Receipt Acknowledged: Date: August 19, 1998 Time: 07:45


Dave Williams, General Superintendent
Petro Environmental Technologies, Inc.


J. Richard Schairbaum, QA Manager
Petro Environmental Technologies, Inc.


Construction Manager, William Zebick
Fluor Daniel Fernald


CQC Representative, Dan Bodine
GeoSyntec Consultants, Inc.

SWU EXCAVATION/OSDF (PHASE II) PROJECT
Subcontract No. FSC 614; Project Nos. 20102/20402
Petro Environmental Technologies, Inc.

#6

2064

NONCONFORMANCE REPORT FORM
NOTICE OF NONCONFORMANCE

To: (Contractor/Subcontractor)

Nonconformance Notice No.: 006

Dave Williams, General Superintendent

Date: August 19, 1998

Petro Environmental Technologies, Inc.

Time: 4:30 p.m.

CONTRACTOR: Your attention is directed to the following occurrence of nonconformance:

Location & Feature of Work: Borrow Area - Identifying clay stockpiles for CQC Conformance Testing/Clay Placement

Description of Problem (Include contract specification/plan/drawing or FDF reference):

Per paragraph 3.06.A of Technical Specification Section 02225, Petro Environmental must identify sources and quantities of clay liner material at least 15 days prior to use to permit conformance of the material by the CQC Consultant. Additionally, Petro Environmental is currently placing clay from a stockpile where conformance testing has not yet been completed.

Possible Cause of Problem:

Petro Environmental is not producing sufficient quantities of clay sources to meet the clay placement demand, therefore, cannot identify and provide stockpile sources to permit conformance testing by the CQC Consultant a minimum of 15 days prior to anticipated use.

How and When Problem Was Located (Include estimate of how long the problem has existed):

Petro Environmental started placing clay from Stockpile #8 on 8/19/98. The decision to place clay from this stockpile at Petro Environmental's own risk was made by the General Superintendent.

Suggested Corrective Action:

Petro Environmental needs to increase its clay production to meet the clay placement demands in Cell 2 and to provide sufficient testing time for the CQC Consultant.

Suggested Method to Prevent Future Similar Problems:

Petro Environmental needs to operate 2 soil screeners on a full-time basis to increase daily production quantities. A third soil screener may need to be made operational, as well as possibly operating 6 or 7 days per week.

Contractor Action Taken:

Petro Environmental is currently placing clay from Stockpile #8 at their own risk, and are making provisions to operate all on-site soil screeners (3) full time to increase daily clay production quantities.

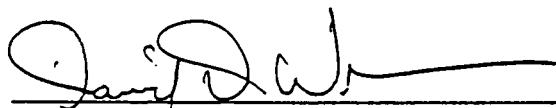
000354

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Receipt Acknowledged:

Date: August

Time: 1705

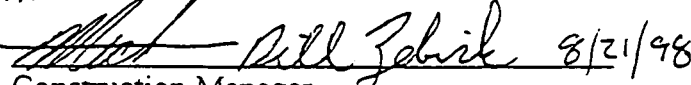


Dave Williams, General Superintendent
Petro Environmental Technologies, Inc.

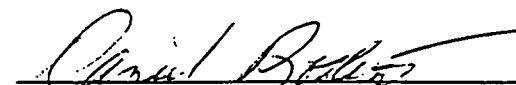


J. Richard Schairbaum, QA Manager
Petro Environmental Technologies, Inc.

MA 8/12/98

 8/21/98

Construction Manager
Fluor Daniel Fernald



CQC Consultant Field Monitor
GeoSyntec, Inc.

000355

NONCONFORMANCE REPORT FORM
NOTICE OF NONCONFORMANCE

To: (Contractor/Subcontractor)

Nonconformance Notice No.: 009

Mark Micochero, Solmax Superintendent

Date: September 17, 1998

Petro Environmental Technologies, Inc.

Time: 10:00 a.m.

CONTRACTOR: Your attention is directed to the following occurrence of nonconformance:

Location & Feature of Work: OSDF Cell 2 – Installation of geosynthetics (secondary layer)

Description of Problem (Include contract specification/plan/drawing or FDF reference):

Paragraph 3.01.C.1 of Technical Specification Section 02770 states that geomembrane panels shall be immediately seamed after its placement. On September 16, 1998, Solmax deployed geomembrane liner material across the toe of the East Slope and ended the work day without seaming this panel.

Probable Cause of Problem:

Solmax did not allow enough time at the end of the day to permit seaming of this panel, does not have enough opening welding equipment (i.e. – wedge welders), and/or lacks enough personnel to deploy both geosynthetic clay liner material and geomembrane liner of sufficient quantities and have it all seamed by the end of the work day.

How and When Problem Was Located (Include estimate of how long the problem has existed):

Petro Environmental, FDF, and GeoSyntec noted the problem at the end of the work day on September 16, 1998.

Suggested Corrective Action:

Solmax needs to better plan and coordinate the deployment of geomembrane sheet to provide enough time to permit welding of deployed sheets by the end of the work day, provide more wedge welding equipment in addition to the one that is currently being rented, and/or provide additional skilled personnel to ensure that all deployed sheets can be welded by the end of each day of work.

Suggested Method to Prevent Future Similar Problems:

Petro Environmental recommends that Solmax: better plan and coordinate the workday's activities to permit deployment of sufficient quantities of both GCL and geomembrane liner material and still seam all deployed GML material, obtain additional wedge welders from Solmax capable of fusion welding the GML in accordance with contract specifications, and provide additional skilled personnel capable of deploying sufficient quantities of the geosynthetic materials and operating the additional welding equipment needed to complete these associated tasks.

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Contractor Action Taken:

Petro Environmental has informed Solmax of this problem and instructed their personnel to weld the previously deployed geomembrane sheet as soon as possible and to ensure that all measures are taken to prevent this problem from re-occurring in the future.

FDF Rep/CQC Rep Comments:

FDF QUALITY ASSURANCE FEELS SOLMAX LACKS THE PROPER SUPERVISION & SKILLED PERSONNEL TO FULFILL THE QUALITY CONTROL & SCHEDULE REQUIREMENTS FOR THIS PROJECT. SOLMAX NEEDS TO IMPROVE THEIR UNDERSTANDING OF THE SPECIFICATIONS & ALSO IMPROVE THE PROCESS OF INCORPORATING QUALITY CONTROL INTO THE PLANNING & EXECUTION OF THE WORK. *MF*

Receipt Acknowledged:

Date:

9.17.98

Time:

1:10 PM

Marc Micochero

Marc Micochero, Solmax Superintendent
Petro Environmental Technologies, Inc.

J. Richard Schairbaum

Richard Schairbaum, QA Manager
Petro Environmental Technologies, Inc.

Dave Williams

Dave Williams, General Superintendent
Petro Environmental Technologies, Inc.

William G. Zebick

Construction Manager, William Zebick
Fluor Daniel Fernald

Mike Godber

QA Team Leader, Mike Godber
Fluor Daniel Fernald

Dan Bodine

CQC Managing Engineer, Dan Bodine
GeoSyntec Consultants, Inc.

SWU EXCAVATION/OSDF (PHASE II) PROJECT
Subcontract No. FSC 614; Project Nos. 20102/20402
Petro Environmental Technologies, Inc.

2064

NONCONFORMANCE REPORT FORM
NOTICE OF NONCONFORMANCE

To: (Contractor/Subcontractor)

Nonconformance Notice No.: 011

Mark Micochero, Solmax Superintendent

Date: September 21, 1998

Petro Environmental Technologies, Inc.

Time: 5:30 p.m.

CONTRACTOR: Your attention is directed to the following occurrence of nonconformance:

Location & Feature of Work: OSDF Cell 2 – Installation of geosynthetics (secondary layer)

Description of Problem (Include contract specification/plan/drawing or FDF reference):

Paragraph 3.01.C.1 of Technical Specification Section 02770 states that geomembrane panels shall be immediately seamed after its placement. On September 19, 1998, Solmax continued deployment of geomembrane liner material across the floor of OSDF Cell 2 (Panel Nos. 31-42), as well as some temporary patches and did not fully complete all necessary seaming. Additionally, south of the tie-in location there is a 22-ft. cap strip, and on both sides of the Intercell Berm between Cells 2 and 3, there are approximately 250-ft. of cap strips. None of these cap strips, and numerous patches have been extrusion welded. As a result, the underlying geosynthetics have become damaged.

Probable Cause of Problem:

Solmax has failed to complete all required seaming and detail work as required by the technical specifications. This problem is due to lack of attention to what needs to be completed to protect the underlying geosynthetics, and lack of enough personnel and/or direction by the Superintendent to ensure that all such work is completed.

How and When Problem Was Located (Include estimate of how long the problem has existed):

Petro Environmental, FDF, and GeoSyntec noted the problem at the end of the work day on September 19, 1998.

Suggested Corrective Action:

Solmax shall make all repairs as required by NCR No. 010, as well as complete all remaining detail work prior to being permitted to deploy additional geosynthetic material. Additionally, Solmax needs to make a commitment to detailing all deployed GML, as well as all patches, the day of deployment, particularly in areas prone to ponding of surface water (i.e. – within the drainage corridor). Particular attention also needs to be made to ensure that all GML is properly lapped so as to prevent surface water runoff from running beneath deployed panels. Additionally, Solmax needs to better plan and coordinate the deployment of geomembrane sheet to provide enough time to permit welding of deployed sheets by the end of the work day, provide more seaming equipment, and/or provide additional skilled personnel to ensure that all deployed sheets can be welded by the end of each day of work.

000358

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Suggested Method to Prevent Future Similar Problems:

Petro Environmental, GeoSyntec and FDF recommend that Solmax pay attention to the lapping of deployed sheet geosynthetics and complete all GML detail work at the end of each work day to provide watertight seal and prevent potential GCL hydration due to stormwater runoff. This is particularly true in areas prone to ponding of surface water (i.e. - within the drainage corridor).

Contractor Action Taken:

Petro Environmental, GeoSyntec, FDF and Solmax will jointly identify GML locations requiring re-work/repairs and list which repairs shall be given the highest priority.

FDF Rep/CQC Rep Comments:

Receipt Acknowledged:

Date:

9.22.98

Time:

7.45

Marc Micochero

Marc Micochero, Solmax Superintendent
Petro Environmental Technologies, Inc.

J. Richard Schairbaum

J. Richard Schairbaum, QA Manager
Petro Environmental Technologies, Inc.

Dave Williams

Dave Williams, General Superintendent
Petro Environmental Technologies, Inc.

William a. Zebick

Construction Manager, William Zebick
Fluor Daniel Fernald

Mike Godber

QA Team Leader, Mike Godber
Fluor Daniel Fernald

Dan Bodine

CQC Managing Engineer, Dan Bodine
GeoSyntec Consultants, Inc.

SWU EXCAVATION/OSDF (PHASE II) PROJECT
Subcontract No. FSC 614; Project Nos. 20102/20402
Petro Environmental Technologies, Inc.

2064

NONCONFORMANCE REPORT FORM
NOTICE OF NONCONFORMANCE

to: (Contractor/Subcontractor)

Nonconformance Notice No.: 010

Mark Micochero, Solmax Superintendent

Date: September 21, 1998

Petro Environmental Technologies, Inc.

Time: 5:30 p.m.

CONTRACTOR: Your attention is directed to the following occurrence of nonconformance:

Location & Feature of Work: OSDF Cell 2 -- Installation of geosynthetics (secondary layer)

Description of Problem (Include contract specification/plan/drawing or FDF reference):

Paragraph 2.30.B of Technical Specification Section 02772 states that GCL materials shall be protected from moisture, deleterious conditions, etc. There is currently one roll of GCL material adjacent to the East Drainage Swale east of Cell 2 that is currently not covered by visqueen to protect from precipitation events, particularly on the ends. Additionally, visqueen covering the GCL stockpile adjacent to the aggregate stockpile in Cell 3 was not secured and permitted rain to accumulate on the stockpiled rolls of material.

Paragraphs 3.03.G & I of Technical Specification Section 02772 states: Prevent hydration of the bentonite core prior to completion of construction of the liner system, and cover and protect the edges of GCL from hydration due to stormwater runoff. Hydrated GCL has been identified as follows: Along the drainage corridor under GML panels S-25 to S-28 (~240 ft.²); under GML panels S-35 to S-37, & S-41 to S-42 (~1,800 ft.²) along the Cell 1/Cell 2 tie-in point; and ~150 ft.² of GCL left exposed on the south side of the Intercell Berm between Cells 2 and 3. Additionally, there are numerous heat patches made on the GML which did not provide a watertight seal, therefore, there is the likelihood of hydrated GCL under these locations as well.

Probable Cause of Problem:

At the tie-in location, Solmax failed to properly lap the GML such that the Phase I GML was lapped over the Phase II GML, therefore, surface water running off the Intercell Berm at this location ran directly beneath the Phase II GML. This thereby permitted hydration of the underlying GCL over a large area. Along the drainage corridor, the patches were simply heat sealed, but never welded into place, thereby permitting water to flow into the non-watertight seam and hydrate the GCL. At the Cell 2/3 Intercell Berm, the GCL was simply not covered with GML rolled back beneath the deployed GML such that it was not exposed.

How and When Problem Was Located (Include estimate of how long the problem has existed):

Petro Environmental, FDF, and GeoSyntec noted the problems on September 21, 1998, following significant rains that occurred on Sunday, September 20, 1998. Additionally, similar GCL hydration problems have previously occurred as noted and identified in Petro Environmental's NCR No. 009.

000360

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Suggested Corrective Action:

Solmax will need to cut the GML and expose all hydrated portions of the previously deployed GCL. The damaged portions shall then be removed and discarded, the subgrade permitted to dry out, and then GCL re-deployed in corresponding locations. After replacement patches have been deployed, bentonite granules shall be placed between the GCL seams, and then the corresponding GML sections repaired and extrusion welded into place per Technical Specification Section 02770. Additionally, locate any potentially damaged GCL beneath temporary GML patches and replace as necessary and finally, complete all GML repairs (i.e. - extrusion weld) to prevent this problem from re-occurring in the future.

Suggested Method to Prevent Future Similar Problems:

Petro Environmental, GeoSyntec and FDF recommend that Solmax complete all detail work on the GML at the end of each work day to provide watertight seals and prevent potential GCL hydration due to stormwater runoff.

Contractor Action Taken:

Petro Environmental, GeoSyntec, FDF, and Solmax will mark all hydrated GCL areas on the GML material to ensure that all hydrated areas have been identified and repaired. This NCR will not be resolved until all identified hydrated GCL areas have been repaired and the corresponding GML repairs/patches completed in accordance with Technical Specification Section 02770.

FDF Rep/CQC Rep Comments:

Receipt Acknowledged: Date: 9.22.98 Time: 7:45

Marc Micochero
Marc Micochero, Solmax Superintendent
Petro Environmental Technologies, Inc.

J. Richard Schairbaum
J. Richard Schairbaum, QA Manager
Petro Environmental Technologies, Inc.

Dave Williams
Dave Williams, General Superintendent
Petro Environmental Technologies, Inc.

William a. Zebick
Construction Manager, William Zebick
Fluor Daniel Fernald

Mike Godber
QA Team Leader, Mike Godber
for Daniel Fernald

Dan Bodine
CQC Managing Engineer, Dan Bodine
GeoSyntec Consultants, Inc.